



UNION OF SOUTH AFRICA

# ANNUAL REPORT

OF THE

## Department of Public Health

YEAR ENDED 30th JUNE, 1936

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*PUBLISHED BY AUTHORITY*

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Price 3s. 9d.

Printed in the Union of South Africa by the Government Printer, Pretoria  
1936

[G. No. 48, '36]

2-28724-1936-1,660.

Printing: £153. 10s. 0d.





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# DEPARTMENT OF PUBLIC HEALTH.

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*Bill Rennie*

*Ch. Murray*

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## Department of Public Health.

# Report for the Year ended 30th June, 1936.

TO THE HONOURABLE THE MINISTER OF PUBLIC HEALTH,  
PRETORIA.

I have the honour to submit herewith the Report of the Department of Public Health for the year ended the 30th June, 1936.

### I.—INTRODUCTORY.

#### *Pan African Health Conference, 1935.*

In November, 1932, a Conference of the health representatives of certain African territories met in Capetown under the auspices of the Health Committee of the League of Nations. That Conference dealt with a number of matters of great importance to Africa as a whole, such as yellow fever, plague, smallpox, leprosy, rural hygiene, dengue fever and the transmission of diseases other than yellow fever by aircraft. On almost every one of these subjects, notably in the case of yellow fever, further information or new developments calling for action by public health authorities seemed likely to need attention in the near future. For this reason and since the advantage afforded of personal discussion between responsible officials of neighbouring territories in Africa had been so strikingly shown at the Conference the delegates recommended that a further Conference be convened not later than 1935.

Early in 1934, therefore, unofficial enquiries were made to ascertain the views of the principal health administrators in Africa as to the desirability of holding a further Conference and when it was ascertained that there was unanimity of opinion on the point and also that there was little probability of any of their Governments feeling themselves able to provide the venue of the Conference, the Union Government again approached the Health Organisation of the League, reminded it of the resolution taken at that Conference, and suggested that a further Conference be held in November, 1935: It was stated in this communication that the Union Government would be happy again to provide the venue of the Conference and to act as host if so desired.

The matter was considered by the Council of the League which, on the technical advice of the Health Committee, decided in January, 1935, that the proposal should be agreed to, and invitations were issued in due course by the Health Committee of the League.

It had originally been intended, for reasons of economy, to hold the Conference once again in Capetown. A number of intending delegates, however, had enquired as to the possibility of being given the opportunity of studying health work on the gold mines in connection with their projected visits to the Union. The Chamber of Mines came forward and generously promised to make itself responsible for the extra cost and consequently it was decided to transfer the venue of the Conference to Johannesburg where, through the courtesy of the Principal of the University, most suitable accommodation had been offered at the University of the Witwatersrand for its meetings.

The following countries were represented at the Conference which was duly opened on the 20th November by the Honourable the Minister of Public Health:—

Mandated Territory of South West Africa,	Mozambique,
Angola,	Nigeria,
Basutoland,	Nyasaland,
Bechuanaland,	Northern Rhodesia,
Belgian Congo,	Southern Rhodesia,
French Colonies,	Sierra Leone,
Gambia,	Swaziland,
Gold Coast,	Tanganyika,
Kenya,	Uganda,
	Zanzibar.

In addition representatives of the Health Committee of the League of Nations, of the Office International d'Hygiene publique and of the International Health Division of the Rockefeller Foundation attended the Conference and India sent an observer.



The Union of South Africa was represented at the Conference by the Chief Health Officer and the following delegates, namely: A. J. Orenstein, C.M.G., M.D., LL.D. (Hon.), M.R.C.S., Chief Medical Officer, Rand Mines, Johannesburg, and a member of the Council of Public Health; Sir Spencer Lister, Kt.B., LL.D. (Hon.) (Cape of Good Hope), M.R.C.S., Director of the South African Institute for Medical Research, Hon. Professor of Pathology and Bacteriology in the University of the Witwatersrand, and a member of the Council of Public Health; P. J. du Toit, B.A. (Cape of Good Hope), Dr. Phil. (Zurich), Dr. Med. Vet. (Berlin), D.Sc. (Stell.), Director of Veterinary Services and Dean of the Faculty of Veterinary Sciences (University of Pretoria), and a member of the Council of Public Health; F. C. Willmot, M.D., D.P.H., Senior Assistant Health Officer; G. A. Park Ross, M.D. (Edin.), D.P.H. (Edin.), Senior Assistant Health Officer; E. H. Cluver, M.A., M.D., B.Ch. (Oxford), B.A. (Cape of Good Hope), D.P.H. (Lond.), Senior Assistant Health Officer and Senior Lecturer in Public Health in the University of the Witwatersrand.

The Conference discussed a number of matters submitted by the representatives of the different States such as yellow fever, plague, malaria, typhus, the typhoid carrier problem, the dangers connected with locust poisoning, animal diseases communicable to man, hygiene and medical services in rural areas and proposals for the better co-ordination of health work in Africa, and passed a number of important resolutions thereon.

Towards the end of March the Chief Health Officer, who had been the President of the Conference, proceeded to Europe on leave and the Honourable the Minister of Public Health arranged for him to attend the meetings of the Health Committee in Geneva and of the Office International d'Hygiene publique in Paris during the period 29th April-13th May, when it was anticipated that the report of the Conference would be discussed and to study the working of the two international health organisations.

The Health Committee at its 23rd session duly discussed the various recommendations of the Conference, and adopted the following resolution for submission to the Council of the League of Nations:—

“ The Health Committee—

- (1) desires to call the Council's attention to the success achieved by the Pan African Health Conference held at Johannesburg in November, 1935, at the request of the Government of the Union of South Africa and under the auspices of the Health Organisation;
- (2) takes note of the request of the Conference to set up machinery under the aegis of the Health Organisation whose duty it would be to prepare future Pan African Health Conferences and requests the Bureau to consider how this suggestion could best be carried out;
- (3) takes note of the Conference's suggestion regarding the organisation of interchanges of individual medical personnel between African countries and requests the Bureau to consider the steps to be taken with a view to putting this into effect;
- (4) requests the Council to consult with the Governments concerned on the above forms of co-operation which the Committee deems highly desirable.”

This resolution came before the Council at its ninety-second session on 11th May, 1936, and was duly approved.

#### *The Two Official International Health Organisations.*

It has always been difficult in South Africa to appreciate the necessity for the maintenance of two official international health organisations, viz., the Health Committee of the League of Nations and the Office International d'Hygiene publique. The following note may, therefore, be of interest.

Article 23 of the Covenant of the League of Nations provides, *inter alia*—

“ Subject to and in accordance with the provisions of international conventions existing or hereafter to be agreed upon, the members of the League . . . will endeavour to take steps in matters of international concern for the prevention and control of disease.”

Under this power a special commission shortly after the Great War was appointed to deal with an epidemic of typhus in Poland and a provisional committee was established at Geneva to build up a health organisation.

But under the Rome Agreement of 1907 the Office International d'Hygiene publique had been created. This is a governmental body representing fifty-three nations with a permanent Secretariat in Paris, which has always functioned extremely well. Its work has not been in the limelight, however, and, though by its work the Office has earned the appreciation



of all the health departments of the world, outside those departments its work has not received the publicity which is really its due. It has been responsible, *inter alia*, for the framing of several international conventions, more particularly the International Sanitary Convention of 1926 dealing with certain formidable epidemic diseases and more recently the International Convention for the Sanitary Control of Aerial Navigation. The work of the Paris Office is carried out by a small secretariat with a meeting of delegates twice a year. Under its statutes it can enquire into any matter affecting the public health of the world. If a matter is to be enquired into, the delegates collect information on the subject from their respective countries, the papers are read at the session, and a commission is appointed to study the matter. The commission's report is then brought before a full plenary session and, if adopted, it is then circulated to the nations of the world.

The cost of maintaining the Paris Office amounts to about 1,650,000 French francs annually which is provided by the subscribing nations, the larger each providing 76,875 francs, while the smaller nations are assessed on a lower scale. The subscription of South Africa amounts to 24,000 francs annually.

It will thus be seen that the organisation has cost the world only about £22,000 per annum, at the old rate of exchange, out of which is paid a Secretariat costing a little over £9,000, the balance being expended on delegates' expenses and on printing. The Organisation is, therefore, a very economical one and the expenditure is under strict control. The defect in the Organisation lies in the fact that the official language is French only, and the usefulness of the Organisation and of its publications would be greatly increased if the official languages were French and English. For a number of years past, Col. P. G. Stock, C.B., C.B.E., of the staff of the Ministry of Health, and formerly Director of Medical Services of the Union Defence Forces, has been the delegate of South Africa at the Paris Office, and the Department is greatly indebted to him for his services in that capacity.

It would seem probable that when the Covenant was framed the provisions of the Rome Agreement of 1907 establishing the Office International d'Hygiene publique were entirely overlooked, and the nations, in agreeing to the relative clause in the Covenant, proceeded through the League to establish, under article 23, the nucleus of another international health organisation—the Health Organisation of the League of Nations.

In 1920 a mixed committee was set up under the chairmanship of Lord Astor, appointed, for the one part, by the Council of the League and, for the other, by the Permanent Committee of the Paris Office. The object was to draw up a scheme for the fusion of the temporary machinery set up by the League for dealing with health matters of immediate interest to the League and the Paris Office which already occupied itself with international health and particularly with conventions for the prevention and control of infectious disease. The scheme was prepared, but failed to be accepted, owing largely to the fact that the United States of America did not become a member of the League of Nations and could not, therefore, as a signatory of the Rome Agreement of 1907, under which the Paris Office was set up, agree to that Office being absorbed into the new organisation of which the United States was not a member.

The necessity for co-ordination and the prevention of overlapping in work and expenditure quickly became apparent, however, and the Council of the League on 30th January, 1923, in consultation with the Office International d'Hygiene publique, established a special mixed committee (subsequently known as the Granville Commission), to prepare a scheme for the permanent Health Organisation of the League of Nations, this mixed committee consisting of eight members from each organisation.

The committee duly met, and, on the 2nd June, 1923, the chairman signed a report, on behalf of the committee, without any reservation whatsoever from any member.

In this report the committee stressed that the establishment of a single international health organisation, much as it was to be desired, was not attainable under the circumstances then existing and, in order to prevent confusion and duplication of work, it suggested that the following scheme be adopted—

The Health Organisation of the League of Nations to consist of—

- (1) a General Advisory Health Council;
- (2) a Standing Health Committee;
- (3) a Health Section of the Secretariat of the League of Nations.

The Committee of the Office International d'Hygiene publique to act as the General Advisory Health Council, and the Office International d'Hygiene publique to remain autonomous



and retain its seat in Paris without any modification of its constitution or functions;

The Standing Health Committee to consist of the President of the Office International d'Hygiene publique and fifteen other members (public health officers or experts); nine of these members to be appointed individually for three years by the Committee of the Office International d'Hygiene publique in such a way that each State, which is a permanent member of the Council of the League of Nations, is represented on the Standing Health Committee; the remaining six members to be appointed also for a period of three years by the Council of the League of Nations after consultation with the Standing Health Committee.

It was provided that the Standing Health Committee would be supplemented by the addition of not more than four public health experts as assessors, these assessors to be appointed by the Council of the League of Nations on the nomination of the Standing Health Committee and to be considered as fully effective members.

The functions of the General Advisory Health Council, the Standing Health Committee and the Health Section of the Secretariat of the League of Nations were all clearly defined. It was laid down that the duties of the General Advisory Health Council were to consider, advise and report on questions submitted to it by the Standing Health Committee, to initiate and transmit to the latter body any question which it considered might be advanced by such a procedure; the two secretariats were to keep closely in touch and to communicate each to the other all documents, copies of which must be sent also to every member of the Committee of the Office and of the Standing Health Committee. It was provided that any supplementary expenses incurred by the Office as a result of requests from the Council of the League would be defrayed by the General Secretariat of the League. The Standing Health Committee was to direct the health work of the League of Nations and, through the Medical Director, the work of the Health Section of the Secretariat.

It was recommended that the Standing Health Committee should be required to consider and report to the Council of the League of Nations on any public question which might be submitted to it or initiated by itself.

Also it would appoint special committees to consider any enquiry, research or other public health matter, and might co-opt outside experts to further the purposes aimed at. It is required to submit a yearly report to the Office International d'Hygiene publique relating to the work of the Health Organisation.

The Health Section of the Secretariat of the League of Nations was to form the Secretariat of the Health Organisation of the League, to function under the Medical Director, as laid down by the Standing Health Committee, and approved by the Secretary-General of the League of Nations.

The report of the Granville Commission was adopted by the Council on the 7th July, 1923, and approved of by the Assembly on the 15th September, 1923, and four assessor members were appointed.

Several years later the Health Committee was augmented by four more "assessors" who, in the absence of rules to the contrary, appear to have been regarded as ordinary members and allowed to vote.

The rules of procedure of the Health Committee were adopted on 20th February, 1924. Under these the Committee was to meet twice a year, its work in the interim being co-ordinated by a Bureau. The original Bureau consisted of the President of the Health Committee, the Chairman of the Advisory Council (i.e. the President of the Office International d'Hygiene publique), as *ex officio* Vice-President, and two other Vice-Presidents who could not hold office for more than a year during the term of office of the Committee. The Bureau apparently did not function to the satisfaction of the Committee and in 1932 it was enlarged by the addition of two additional elected Vice-Presidents. In 1935 the Bureau was again enlarged to consist of the President of the Health Committee, the President of the Office International d'Hygiene publique, and eight members including the representatives of the Powers with a permanent seat on the Council. By this time the Health Committee had been instructed to curtail its sessions to one per annum on account of the need for economy, thus throwing greater responsibility on its Bureau.

It would seem to be a fact that the Committee of the Office International d'Hygiene publique has rarely, if ever, been used by the Standing Health Committee at Geneva as its General Advisory Health Council established under the Granville Agreement. There would seem also to have been some friction and overlapping in functions and work between the two international health organisations.



In 1935 the report of the committee appointed to study the constitution, procedure and practice of committees of the League of Nations was published (Document A. 16, 1935). It referred to the Health Organisation in the following terms—

“ 4 Health Organisation.

The Health Organisation is an especially complex one because it requires to be adjusted to and co-ordinated with the Office International d'Hygiene publique at Paris established by convention prior to the League Covenant.

“ The Committee will not attempt any full examination of the Organisation but will confine itself to a few reforms which seem desirable.

“ The Health Committee has so grown that, while still inadequate to serve the purpose of a general conference, it is too large and unwieldy to serve as a consultative committee to the Council in relation to current work. This would still be true even if its original composition were restored. The situation has led the Bureau of the Committee to assume responsibilities for which its existing composition is inadequate.

In these circumstances it is suggested—

- (a) that the Bureau should be abolished.
- (b) that the Health Committee should be reconstituted so as to comprise within a membership of about ten persons the varying national and technical experience required to fit it to be an effective consultative body and that it should meet as a rule before the ordinary sessions of the Council. The heads of the principal national health administrations should be members of the Committee.

“ As general discussions on a wide basis, for which the existing Health Committee serves to some extent, are highly desirable, the Office International d'Hygiene publique might be asked to arrange for such discussions at the time of the regular meetings (or one of them in the year) provision being made for members of the League to be represented. Those present would in all cases be delegates attending the Office's regular sessions for its own defined tasks but would not necessarily include the whole of its Permanent Committee.”

In September, 1935, the Assembly of the League examined the proposals of the special Committee and recognised the need of improving the present working of the Health Committee and, therefore, of taking the said proposals into consideration. But in view of the radical changes proposed the Assembly instructed that the Office International d'Hygiene publique should, before a decision was taken, be consulted as to the part it would have to play in the suggested reforms.

On the 24th April, 1936, the Council instructed the Secretary-General to obtain the opinion of the Paris Office “ as to the part it would have to play in the suggested reforms ” and the matter was officially submitted by letter dated 4th March, 1936, and came before the meeting of the Office during its May session.

The matter was referred to a commission during the session of the Paris Office and eventually a report was brought up for transmission to the Secretary-General and adopted in plenary session to the effect that the Permanent Committee of the Office International d'Hygiene publique would desire the maintenance of the existing Granville Agreement with slight modifications of detail, such as the enlarged Bureau appointed at the last meeting of the Assembly, and an increase in the members of the Health Committee if such was thought necessary. This bicameral agreement has, in its opinion, worked well on the whole for more than 12 years. Nevertheless, if the new order at Geneva will not permit of its continuation, the Permanent Committee is prepared to meet the proposed reorganisation envisaged in the plan of the Reorganisation Committee and to take its part as far as lies in its power. The statutes of the Paris Office prevent the Committee from accepting fully the proposals but, since the Paris Office is already the General Consultative Council of the Health Organisation of the League and since it is a governmental body representing fifty-three nations, it sees no reason why Geneva should not accept it as a consultative body for health questions almost fully representing the League. The number of countries, members of the League but not members of the Paris Office, is so few (and those countries of so little relative importance), that the distinction in view of the Paris Office does not warrant the setting up in Geneva of what would in effect be an exactly similar body. On the contrary the Permanent Committee of the Paris Office would offer advantages which Geneva itself could not at the moment obtain



in that three first class Powers, namely, Germany, the United States and Japan, who are not members of the League, would by this means willingly co-operate with the League in health matters.

The Health Organisation of the League of Nations has had an annual budget of approximately one million Swiss francs annually (£62,626), of which approximately 600,000 (£40,000) is spent on staff. The Health Secretariat is, therefore, a much more expensive one than that at Paris. The present Health Organisation has, however, done some very valuable work and that which is appreciated most in Southern Africa is probably the work carried out by the Permanent Commission on Biological Standardisation.

There is obviously urgent need for the removal of the causes of friction between the international health organisations established in Geneva and Paris and for a reconstitution of the body established in the former place, though, perhaps, not exactly on the lines proposed to the Assembly of the League of Nations in 1935.

*Yellow Fever.*—In the following notes I have drawn exhaustively from an admirable summary prepared by Col. S. P. James, President of the Yellow Fever Commission, for consideration by the Office International d'Hygiene publique. Much of the time of the Pan African Health Conference and, to a less extent, of the May session of the Office International d'Hygiene publique, was given over to discussion on yellow fever on account of the recent discovery that much of the yellow fever that is present in the world to-day exists endemically in the absence of *Stegomyia fasciata* (*Aedes aegypti*) and that some of it exists endemically in the absence of human beings. Hitherto it has been taught that human beings were the only source and reservoir of yellow fever virus and *Aedes aegypti* the only insect vector. That teaching is still correct for the variety of yellow fever with which it dealt—known now as urban yellow fever—but it is insufficient for two other varieties which have been found during the last three years to be widely distributed in South America. Both these varieties exist endemically in the complete absence of *Aedes aegypti*. One of them, which is called “rural yellow fever without *Aedes aegypti*” occurs in strictly rural areas in which the human population is sufficiently numerous and sufficiently aggregated to justify the view that the cycle of infection is from man to vector and from vector to man; the other which is called “jungle yellow fever” occurs in areas of uncleared jungle and forest or on land that is being cleared for agriculture or along the banks of rivers in places which are not, and never have been, inhabited by man or in which the human inhabitants are so small in number and so scattered, as to rule out the view that they could be the source and reservoir of the infection.

Dr. Soper—the representative of the International Health Division of the Rockefeller Foundation at the Pan African Health Conference—stated that almost without exception all the yellow fever during the last few years in Columbia, Bolivia and Brazil occurred in the absence of *Aedes aegypti* and that most of it was of the variety called “jungle yellow fever”. The epidemiological picture of jungle yellow fever is quite different from that of yellow fever transmitted by *Aedes aegypti*. The latter is a “home or family” disease to which all non-immunes who live in or visit an infected house are equally liable. Jungle yellow fever on the other hand is not contracted in houses; it is contracted in forest or jungle or in fields situated close to uncleared areas and only those members of a family who work in or visit these places become infected. The observation that the disease chiefly affects workers on the land and is not contracted in houses is supported by an examination of its incidence by age and sex in different localities. This shows that many more cases occur among males than amongst females, and that the great majority of cases among males occur at ages when they would be working on the land. The rare cases among children are explained on the knowledge that they sometimes accompany their parents to the fields. Dr. Soper showed, in fact, that jungle yellow fever was an occupational disease associated with work in the fields as contrasted with urban yellow fever, which is contracted in houses chiefly during the period devoted to rest.

There seems little doubt now that human beings are not essential to the continuance of endemicity nor to the spread of the disease from one place to another. As Col. S. P. James remarks, it would seem that jungle yellow fever in man must be regarded as an accidental happening in the course of an epizootic among the lower animals. This view receives support from observations proving that monkeys caught in widely separated endemic areas in South America possessed an acquired immunity to infection.

About the insect vector of this variety of yellow fever several species of mosquitoes other than *Aedes aegypti* (which was never found) were abundant in the jungle areas in which outbreaks were observed, particularly several species of the widely distributed genus *Haemagogus* including “the blue mosquito” *Haemagogus equinus* which was observed to attack human beings viciously in those areas.



The virus has been isolated from human cases of jungle yellow fever in Brazil, and is being studied in monkeys and mice. It is believed to be identical with the virus isolated from cases of urban yellow fever and, like that virus, it is transmissible from monkey to monkey by the mosquito *Aedes aegypti* as well as by other species. Clinically and pathologically, also, no difference between jungle yellow fever and the urban variety has been observed, and the results obtained by the application of the mouse protection test in persons who have recovered from the disease, and by histological examination of specimens of liver tissue from fatal cases are identical. It would seem probable that further study of "rural yellow fever without *Aedes aegypti*" may show that its epidemiology is the same as that of "jungle yellow fever" for up to the present all observations of yellow fever without *Aedes aegypti* have been made in places where the clearing of the land or jungle has not been complete.

The discovery of rural or jungle yellow fever in South America made it clear that it was no longer safe to assume that localities in which the youngest donors of protective serums are of adult age are localities in which yellow fever does not exist at the time of examination and has not existed within recent years. Indeed absence of evidence of immunity among the inhabitants of towns and ports can no longer be regarded as indicating that the district in which they are situated is free from infection. The protection test survey of towns in Matto Grosso gave no evidence of previous yellow fever for the percentage of positive results in 1,055 tests was only 1.6. But when the survey was extended to neighbouring rural areas positive results as high as 53 and 71 per cent. were obtained.

Turning now to Africa, cases were notified during 1935 in French Equatorial Africa, the French Colonies of Dahomey, Ivory Coast, Niger, Senegal and Sudan and in the Mandated Territory of Togoland. Cases occurred also in the British Colonies of the Gambia, Gold Coast, Nigeria and Sierra Leone. During the first quarter of 1936 further cases occurred in the Gold Coast.

The immunity survey which was begun by the International Health Division of the Rockefeller Foundation, largely as a result of the Pan African Conference held in Capetown in 1932, was completed in 1935. The enquiry was conducted with the assistance of the governments concerned and many of the 14,818 specimens of blood serum examined were collected by medical officers of the several countries. The following conclusions have been arrived at by the officers responsible for the investigation:—

- (1) In Africa immunity to yellow fever among human beings (giving evidence of recovery from an attack) is widely but irregularly distributed over a region extending from the coast of Senegal eastwards for 3,300 miles to the upper reaches of the White Nile in the Anglo-Egyptian Sudan. The northern boundary is the Sahara desert, the southern follows the Atlantic coast to Northern Angola and then runs eastward across Angola and the southern part of the Belgian Congo. The region lies between latitudes 16 degrees north and 6 degrees south and its maximum width would seem to be about 1,400 miles.
- (2) Although the region as a whole may be considered as the endemic region of yellow fever in the Eastern Hemisphere, it contains areas in which no immunes were discovered, others in which only a small number of adults was found to be immune and others in which a high percentage of immunes was found both in adults and children. A zone in the last of these categories extends from the eastern part of the French Cameroons across French Equatorial Africa overlapping the northern edge of the Belgian Congo and into the Anglo-Egyptian Sudan as far as Rumbek.
- (3) The western area of the region extending from the coast to the eastern border of Nigeria, has had numerous epidemics of yellow fever both on the coast and in the interior; but in the eastern area yellow fever has never been recognised except for the probable case recorded by Hewer at Wau. Moreover, in this region Europeans, stationed in places where a large proportion of the natives is immune, have never been known to contract yellow fever, and Europeans and natives alike, whose blood was tested because they gave a history indicating that they may have had the disease, gave no evidence of having acquired an immunity. Thus there is a radical difference between the situation in the two regions. The reason for the difference is not yet known. Egypt, the Anglo-Egyptian Sudan, Uganda and Northern Rhodesia are among the countries in which some positive results were obtained. In Egypt there were three protective sera among two hundred and thirty-seven collected in four cities, but the protective power of one of the sera was weak and transient. Drs. Sawyer and Whitman have expressed the opinion that the



extremely few protective sera may have been due to sporadic infection introduced by travellers, or possibly to an exceptional concentration of a non-specific factor in the blood. In the Anglo-Egyptian Sudan the results showed that the south-western area of this country contains many persons who have acquired immunity to yellow fever. The results in Uganda were described as indicating that the western and north-western parts are definitely within the area of recent infection with yellow fever virus, but that the region is relatively unfavourable to the transmission and maintenance of the disease. The results in Northern Rhodesia were said to suggest that some immunisation may have taken place in the northern and north-eastern region, but interpretation was difficult on account of the small number of specimens and uncertainty regarding the past history of the two persons whose sera gave protection.

Following the work done in South America, the mouse protection test is being carried out on monkeys in Africa, and already a few monkeys, including a chimpanzee from French Guinea, a baboon from the Belgian Congo and Colobus monkeys from the Gold Coast, and a *Cercopithecus* from the Anglo-Egyptian Sudan have been found to possess an acquired immunity.

It would seem almost certain, therefore, that we have in Africa the same epidemiological factors as have been found to exist in South America.

The following resolutions on yellow fever were adopted by the Pan African Conference:—

“ The Conference recommends:

1. That investigations as to the existence of yellow fever by means of the mouse-protection test, accompanied or followed by clinical investigation and histopathological examination (including the routine use of the viscerotome), be carried out in all endemic regions in Africa, and particularly along the periphery of such regions, in order to ascertain as soon as possible those in which the disease actually exists.
2. That an intensive study of the possibility of the existence of jungle yellow fever in Africa should be made in view of the presence of this condition in South America.
3. That consideration be given to the training of laboratory workers in yellow-fever research and routine investigations and that provision be made for permanent laboratory facilities in centres accessible to endemic areas.\*
4. That further investigations be made regarding the distribution of *Aedes aegypti*, both in endemic and in other African territories to which the disease may spread.
5. That consideration be given to the organisation of measures for the control of *Aedes aegypti* in all territories included within and bordering upon endemic areas.†
6. That a system be established of quarterly reports to the Office International d'Hygiene publique of house larval indices relating to *Aedes aegypti* from important centres in endemic areas.
7. That every first case of yellow fever and the locality in which it has occurred be notified direct, by telegram, as soon as official information is available, to the Office International d'Hygiene publique by African Colonial Administrations.
8. That the decision to suspend traffic in an aerodrome which, situated in a region in which yellow fever has appeared, is not organised in accordance with the provisions of article 38 of the International Sanitary Convention for Aerial Navigation of 1933, and the decision to reopen the aerodrome to traffic be similarly notified direct to the Office International d'Hygiene publique.
9. That the personnel of aircraft operating in endemic areas be protected by vaccination against yellow fever.
10. That investigations be made as to the practicability of mosquito-proofing of aircraft used in endemic areas or of taking other measures against mosquito infestation of aircraft.

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\* A conclusion of a similar nature (No. 5) was reached at the Capetown Conference of 1932.

† The two preceding resolutions follow, generally, the thirteenth and fourteenth conclusions, respectively, arrived at in the discussion on yellow fever at the Capetown Conference in 1932.



11. That the principle of residential areas reserved for European accommodation in yellow fever endemic areas (which has proved so valuable a protection to the non-indigenous element) should be strictly adhered to."

One of the outstanding results of the Conference was a decision taken by the British Colonial Office to establish through the agency of the Uganda Government a laboratory for yellow fever research at Entebbe in the old inter-colonial research laboratory, which was established for the investigation of problems connected with sleeping sickness and is no longer used for that purpose.

I may mention in conclusion that the French authorities in Africa have recently drawn attention to the fact that in addition to mild varieties of the disease which cannot be diagnosed clinically, there are fatal varieties in Africa in which the clinical symptoms during life give no reason for supposing that the disease is yellow fever. Amongst these, an important variety recently found, is one in which nervous symptoms and lesions predominate. If cases of such a nature occurred in a new area it probably would be some time before they were recognised.

The danger of yellow fever reaching the East Coast of Africa is considerable and, if it does so, Mozambique and the Union are almost bound to become infected. *Aedes aegypti* are plentiful at most centres in the coastal belt of Eastern Africa down to the north-eastern portion of the Cape Province, and it is obviously the duty of local authorities in these areas, while there is yet time, to organise measures for the control of this vector in their respective areas. One has only to remember the epidemic of dengue fever (which is also spread by the *Aedes aegypti*) a few years ago in Natal, to imagine what might happen if the virus of yellow fever were to be introduced into the area. The cause of any further easterly spread of the disease is more likely to be through motor-cars than by aeroplanes, but the possibility of spread by the latter cannot be ignored, and the position must be adequately safeguarded. It would, indeed, be a national disaster if yellow fever were to be introduced into the eastern portions of Southern Africa under present circumstances.

*The Permanent Commission on Biological Standardisation.*—One of the most useful commissions appointed by the Health Organisation of the League is the Permanent Commission on Biological Standardisation. An intergovernmental conference on Biological Standardisation was held at Geneva in 1935 and had, as its main object, the making of the international standards better known and the encouraging of the various countries to establish national centres for the distribution of standards.

On the first point, the influence exerted by the Conference is making itself felt and standards are now being issued to thirty-seven countries. Further national distribution centres are being established; that for South Africa is the new Biological Control Laboratory in Capetown.

At its session in October, 1935, the Commission drew up an extensive programme of work embracing certain of the subjects that the intergovernmental conference had recommended for study. That programme is now being carried out.

The question of the standardisation of anti-venom sera is so far-reaching that the Commission has decided to confine its investigations for the present to anti-viper serum. It appears from a preliminary enquiry that the antigenic properties of the venom of African and Asiatic vipers differ so widely that their anti-sera could only be standardised through the establishment of a series of monovalent standards. The Commission proposes, therefore, for the present to confine attention to the European viper. The question of the standardisation of anti-cobra serum on the other hand, seems less complicated, as the South African serum is equally protective against Indian cobra venom. It might, therefore, be possible to establish a single standard serum. It is proposed to secure the co-operation of the Bandoeng and Saigon Institutes in Asia and of the South African Institute for Medical Research and of the Biological Control Laboratory in Capetown in investigating this problem.

*Provincial Consultative Committee.*—Turning now from international health questions to those nearer home it has to be recorded that the establishment of the Provincial Consultative Committee, which resulted from a Conference to consider the report of the last Provincial Finance Commission, is already yielding fruitful results in the field of public health. It would seem that at long last agreement has practically been reached to secure uniformity in the salaries and emoluments of hospital nurses and also to enable nurses to transfer from a hospital in one Province to a hospital in another without losing their rights to pension.

Further proposals have been brought forward in consultation with the South African Medical Council which will secure uniformity in treatment

of the hours of training of probationers. This should do something in time to alleviate the shortage of trained nurses which at present exists in the Union.

*King George V. Silver Jubilee Fund for Combating Tuberculosis.*—Up to the date of writing contributions to the fund received by the Board of Trustees total £101,326. 12s. 11d., the annual income from which will amount to approximately £3,500. The Board has now arranged temporarily with the provincial branches of the South African Red Cross Society to act as the distributors of its funds in the Provinces of the Cape, Transvaal, and Orange Free State, and with the Natal Anti-Tuberculosis Association to perform a similar function in Natal. For the year ending 30th June, 1937, the Board has allocated the sums to these bodies amounting to £2,300, the balance of the Board's income being retained mainly to meet the needs of dependents of sufferers to be admitted to the new tuberculosis hospitals now in the course of erection.

The Board has decided to devote, for the present, its annual income mainly to the relief of dependents of sufferers from tuberculosis who are undergoing treatment in institutions.

## II.—VITAL STATISTICS.

*Population.*—The total population of the Union at 30th June, 1935, as estimated by the Director of Census was 8,600,300, consisting of 1,944,200 Europeans and 6,656,100 non-Europeans. The non-European population may be further divided up into 5,842,700 Bantu, 201,400 Asiatic and 612,000 mixed and other coloured.

The salient features of the vital statistics of the European population for the past sixteen years are summarized in Table A (i). Information of this nature cannot yet be compiled for the non-European population owing to the absence of the necessary data. Notification of non-European births and deaths is compulsory only in urban areas, and in many of these owing to the large proportion of non-European male adults temporarily resident as labourers and to other circumstances, computations of death-rates and similar statistics are useless or misleading.



TABLE A (i).—UNION OF SOUTH AFRICA: SUMMARY OF VITAL STATISTICS OF EUROPEAN POPULATION, 1920-1935.

Calendar Year.	European Population (estimated).	Birth Rate per 1,000 of Population.	Death Rate per 1,000 of Population.		Death Rate per 100,000 of Population from				Percentage of Total Deaths, the Cause of which was Medically Certified.	Infantile Mortality Rate (Deaths of Infants under One Year per 1,000 Live Births Registered).	Maternal Mortality Rate (Deaths of Mothers in connection with Pregnancy or Childbirth per 1,000 Live Births Registered).	Survival Rate or Rate of Natural Increase (Excess of Births over Deaths per 1,000 of Population).
			Actual or Crude.	Standardized.*	Diseases of Heart and Circulatory System.	Pneumonia and Bronchitis.	Cancer.	Tuberculosis (all forms).§				
1920.....	1,499,911	28.97	11.09	12.15	95.67†	113.87†	58.94†	46.00†	79.78	90.07	4.10†	17.88
1921.....	1,519,488†	28.44	10.41	11.43	102.91	136.15	69.09	58.26	80.76	77.09	4.94	18.03
1922.....	1,556,241	27.52	9.48	10.41	97.99	127.24	70.88	47.74	82.96	72.91	5.21	18.04
1923.....	1,579,733	26.70	9.77	10.65	108.50	120.72	78.94	46.46	82.77	74.42	5.22	16.93
1924.....	1,610,774	26.29	9.62	10.44	123.92	123.79	76.36	51.59	84.74	73.73	4.75	16.67
1925.....	1,637,472	26.51	9.39	10.15	128.86	97.04	72.86	52.70	86.45	68.39	5.62	17.12
1926.....	1,676,660‡	26.16	9.59	10.28	127.21	113.44	71.18	53.41	87.76	64.82	4.56	16.57
1927.....	1,708,955	25.95	9.73	10.34	122.76	110.42	73.20	50.50	89.93	70.62	4.80	16.22
1928.....	1,738,937	25.77	10.15	10.69	133.53	127.72	77.52	50.95	89.93	70.49	4.98	15.62
1929.....	1,767,719	26.15	9.51	9.98	127.11	104.04	77.44	45.37	90.19	64.22	5.26	16.64
1930.....	1,797,900	26.44	9.69	10.08	132.33	112.87	82.62	46.76	91.15	66.84	5.26	16.75
1931.....	1,829,300	25.38	9.37	9.56	131.53	103.75	85.55	44.22	90.46	63.07	4.70	16.01
1932.....	1,859,400	24.17	9.97	9.98	137.52	113.75	89.06	42.33	90.84	68.57	5.31	14.20
1933.....	1,890,300	23.55	9.35	9.27	142.52	100.30	95.33	40.68	91.45	61.01	4.81	14.20
1934.....	1,914,700	23.44	9.68	9.55	156.21	94.53	92.39	39.54	91.91	60.79	5.99	13.76
1935.....	1,944,200	24.54	10.61		172.15	133.99	97.21	41.05	92.55	62.81	4.74	13.93

\* The rate which would have obtained had the age and sex distribution of the population been the same as that of England and Wales at the 1901 census, the standard usually taken for international comparisons.

† Medically certified deaths only.

‡ Actual (per census).

§ Includes Miners' Phthisis combined with Pulmonary Tuberculosis.

|| Figures not yet available.

Rates for subsequent years calculated on total deaths registered.

*Natural Increase.*—Populations may increase as the result of migration—excess of immigration over emigration, and of survival—excess of births over deaths. In the Union, migration is having a negligible effect. Natural increase, or the excess of births over deaths is still, however, strikingly high, although it has shown a steady fall during the past two and a half decades as is revealed by Table A (ii). This fall is very largely due to the declining birth-rate. The European death-rate, although the tendency has been on the whole downwards, will be seen from the table not to have improved to any considerable extent. Indeed for 1935 an increase has to be recorded.

TABLE A (ii).—SURVIVAL RATE OR RATE OF NATURAL INCREASE AMONG EUROPEANS IN THE UNION, PER 1,000 OF THE POPULATION.

Year.	Birth-rate.	Death-rate.	Natural Increase.
1911.....	32.2	10.4	21.8
1912.....	32.2	10.3	21.9
1913.....	31.7	10.3	21.4
1914.....	30.2	9.5	20.7
1915.....	29.3	10.3	19.0
1916.....	29.3	10.2	19.1
1917.....	29.0	10.3	18.7
1918.....	28.6	17.2	11.4
1919.....	26.9	11.9	15.0
1920.....	29.0	11.1	17.9
1921.....	28.4	10.4	18.0
1922.....	27.5	9.5	18.0
1923.....	26.7	9.8	16.9
1924.....	26.3	9.6	16.7
1925.....	26.5	9.4	17.1
1926.....	26.2	9.6	16.6
1927.....	25.9	9.7	16.2
1928.....	25.8	10.2	15.6
1929.....	26.1	9.5	16.6
1930.....	26.4	9.7	16.7
1931.....	25.4	9.4	16.0
1932.....	24.2	10.0	14.2
1933.....	23.5	9.3	14.2
1934.....	23.4	9.7	13.7
1935.....	24.5	10.6	13.9

The natural increase rate amongst our European population is exceeded by that of only one other country in which vital statistics are recorded, namely, Egypt in which the rate is 17.6. For convenience of comparison with other dominions and certain western European countries Table A (iii) is inserted.

TABLE A (iii).—COMPARISON OF BIRTH, DEATH AND NATURAL INCREASE RATES AMONG EUROPEANS IN THE UNION WITH OTHER COUNTRIES. AVERAGE RATES FOR THREE-YEARLY PERIODS.

	Birth-rate.	Death-rate.	Natural Increase.
Union of South Africa.....	23.8	9.9	14.0
Holland.....	21.2	8.7	12.5
Portugal.....	29.1	16.9	12.2
Canada.....	21.2	9.6	11.6
Italy.....	23.6	13.8	9.8
New Zealand.....	16.7	8.2	8.5
Australia.....	16.7	8.9	7.8
United States of America.....	17.0	10.8	6.2
Germany.....	15.9	11.0	4.9
England and Wales.....	14.8	12.0	2.8
France.....	16.6	15.6	1.0

The situation revealed by the fertility and mortality rates of most western European populations is disturbing. Their present natural increase is not indicative of a continuance of population growth, as the low birth and death rates are leading to a steadily increasing average age constitution, from which inevitably follows a decreasing reproductive capacity. Unless conditions are changed, it seems that most of these populations must face the threat of extinction.

The high natural increase rate in the Union is due to our relatively high birth-rate. Although the European birth-rate has fallen from 32.2 in 1911 to 24.5 in 1935, it is still as seen from Table A (iii) amongst the highest in the world. The rate for 1935 is higher than those of the previous three years. This improvement will probably be only of a temporary nature attributable to the passing of the financial depression which had unduly accelerated the decline.



Our fertility rate is actually declining more rapidly than the crude birth-rate indicates. The proportion of females to males in our European population has been steadily increasing; fertility rates are most accurately expressed in relation to the female population of child-bearing age. The fertility rate expressed as births per 1,000 women aged 15 to 45 years has fallen in one decade from 137·1 in 1914 to 100·3 in 1933. (Girls under 15 and women over 45 years of age may become pregnant, but these occurrences are exceptional and, therefore, of no statistical importance.)

Though the crude death-rate has changed but little during the past fifteen years, a slight downward tendency is evident from the figures shown in Table A (ii). The infantile mortality rate, however, which is generally accepted as giving a fair indication of the sanitary development of a country shows on the whole a satisfactory decline, from 90·1 in 1920 to 62·8 in 1935. But our European figures which are almost certainly very much better than those of the Bantu compare none too favourably with those of certain other countries as will be seen from Table A (iv).

TABLE A (iv).—INFANTILE MORTALITY RATES: EUROPEANS IN THE UNION COMPARED WITH OTHER COUNTRIES. AVERAGE RATES FOR THREE-YEARLY PERIODS.

New Zealand ... ..	32
Australia ... ..	41
Holland ... ..	42
England and Wales ... ..	60
Union of South Africa ... ..	62
Canada ... ..	73
France ... ..	71
Germany ... ..	70
Belgium ... ..	89
Italy ... ..	100
Lithuania ... ..	137
Portugal ... ..	147

### III.—ADMINISTRATIVE MATTERS.

1. *Staff*.—The organisation and functions of the Department and its principal personnel are set out in Annexure A. Recent legislation led to a considerable increase in public health activities with a corresponding strain on the staff particularly at head office. As the result of representations to the Public Service Commission an investigation was carried out by that body and various adjustments and additions to the clerical staff of head office were made.

The Secretary for Public Health, Sir E. N. Thornton, left for overseas on long leave in March, 1936, and Dr. F. C. Willmot, Senior Assistant Health Officer, Capetown, was appointed Acting Secretary for Public Health. I desire to express appreciation of the zeal and efficiency of Dr. Willmot while acting as Head of the Department.

During the year Mr. N. E. Greenwood was appointed as Pharmacist to take charge of the work in connection with habit-forming drugs.

Dr. J. J. du P. le Roux resigned from the post of Medical Superintendent, Pretoria Leper Institution, and Dr. Loots was appointed Medical Superintendent as from 3rd May, 1936. Dr. J. C. Coetzee, Medical Officer, Pretoria Leper Institution, was transferred to the Transvaal Provincial Administration on 16th March, 1936, and has been replaced by Dr. P. A. Thornton.

The number of sanitary inspectors employed by the Department in the Transvaal and Natal is now 12 as compared with 9 last year. Four lady health visitors were appointed.

Dr. G. A. Batchelor, Port Health Officer and Senior District Surgeon, Durban, relinquished his district surgeon duties and the post was redesignated Port Health Officer as from 1st January, 1936. Dr. J. Mackay was promoted to the post of District Surgeon and Dr. J. H. Stals was regraded as Assistant District Surgeon. The post of Additional District Surgeon was abolished.

2. *District Surgeons*.—In addition to the creation of a fourth whole-time district surgery in Johannesburg and one at Wynberg, further part-time posts were created as follows:—

In the Cape Province, additional district surgeoncies at Karreedouw and Hankey.

In Natal, additional district surgeoncies at Magut and Dannhauser.

In the Transvaal, an assistant district surgery at Pretoria and additional district surgeoncies at Leeuwdoornsstad, Blaauwberg, Hendrina and Balfour.



The present distribution of district surgeons is set out in Table B.

TABLE B.—DISTRICT SURGEONCIES AND ADDITIONAL DISTRICT SURGEONCIES AS AT 30TH JUNE, 1936.

Province.	Whole-time.	Whole-time, but jointly with local authority or public body.	Part-time.			Total.
			On inclusive annual salary.		On annual salary with certain supplementary fees and allowances.	
			District Surgeons.	Additional District Surgeons.		
Cape.....	5	3	—	23	135	166
Natal.....	2	—	—	2	42	46
Transvaal.....	7	—	1	19	57	84
Orange Free State..	1	—	—	13	47	61
UNION.....	15	3	1	57	281	357

The fifteen whole-time officers are those at Capetown (2); Durban (2); East London, Port Elizabeth, Pretoria (2), Johannesburg (4), Pietersburg, Bloemfontein, and Wynberg.

*Periodical Tours by District Surgeons under section four of Act No. 36 of 1927.*—The primary object of these tours is to bring medical aid within reasonable reach of the general public of localities concerned and along the lines of travel, going and returning, and to combine this with preventive action in regard to any matter affecting or likely to affect the health of individuals or families, or of the public.

An outstanding condition under which these tours are authorised is that a district surgeon has to furnish an undertaking in writing to the effect that he will be prepared to see and treat private patients at the out-stations and on the lines of travel at the same fees as he charges patients seen at his headquarters consulting rooms. Private patients living in the outlying areas avail themselves of this opportunity to a considerable extent.

During the course of the financial year ended 31st March, 1936, tours were carried out in 61 district surgeoncies at a cost of £7,691. A total of 30,624 patients were seen and treated by the district surgeons—14,780 Government patients and 15,844 private patients. On the current financial year's estimates an amount of £9,000 has been provided for this purpose, but this amount will have to be increased as several further requests reached this department, which it has not been possible to authorise owing to the insufficiency of funds provided. Every care has been taken to arrange these tours so as not to interfere unduly with private medical practice, and the advice of the Medical Association of South Africa has been freely sought whenever difficulties appeared likely to arise in this connection.

3. *Local Authorities and their Health Staffs.*—The numbers of the various classes of local authorities under the Public Health Act as at 30th June, 1936, are shown in Table C.

TABLE C.—LOCAL AUTHORITIES UNDER THE PUBLIC HEALTH ACT (1919) AS AT 30TH JUNE, 1936.

Province.	Municipalities.	Village Management Boards.	Local Boards.	Village Councils.	Health Committees.	Local Administration and Health Boards.	Magistrates.	Divisional Councils.	Board of Health.	Mining Commissioners.	Total.
Cape.....	132	94	22	—	—	—	29	95	1	1	374
Natal.....	11	—	15	—	17	8	42	—	—	—	93
Transvaal.....	30	—	—	29	39	—	43	—	—	3	144
Orange Free State	61	7	—	—	—	—	38	—	—	1	107
UNION.....	234	101	37	29	56	8	152	95	1	5	718

Whole-time medical officers of health were employed by only twelve of the local authorities listed, namely, the municipalities of Bloemfontein, Capetown, Durban, East London, Germiston, Johannesburg, Pietermaritzburg, Port Elizabeth, Pretoria and Boksburg, the Divisional Council of the Cape and the Board of Health, Kimberley. Most of the large municipalities on the Reef, not mentioned in the above list, have now agreed to fall into line as a result of pressure from the department. With effect from the 1st May, 1936, an agreement was entered into between



the Department of Public Health, the Kimberley Board of Health and the Kimberley Municipality under which a whole-time medical officer of health and an assistant medical officer were appointed who combined the duties of medical officers to the local authorities with those of district surgeon and assistant district surgeon. At Grahamstown and Queenstown there are whole-time officers who carry out the combined duties of district surgeon and medical officer of health to the municipal and divisional councils.

On the 30th June, 1936, 113 local authorities—50 in the Cape, 33 in the Transvaal, 13 in Natal and 17 in the Orange Free State—employed 300 sanitary inspectors and 36 health visitors. These officers are very necessary in all organised communities. Numbers of young men are taking the training prescribed by the Union Government and the Royal Sanitary Institute. A very good type of candidate is entering for the sanitary inspectors' examination and, on account of the large number of candidates and the relatively few posts available, it was recently decided to raise the standard of the examination, which was already much higher than the corresponding examination in Great Britain. On the other hand the supply of trained health visitors is only about equal to the demand.

#### IV.—WORK OF THE DEPARTMENT.

1. *Inspections, Investigations and Field Work.*—Accounts are given in the appropriate sections of this report of the investigations and field work carried out by officers of the Department. Emergency work connected with infectious diseases must necessarily be given preference over routine constructive work. As such emergency work in connection with epidemic diseases like typhus, plague and malaria, bulks very largely in the Department's activities, there is real danger of the less urgent, but none the less important, constructive work being neglected.

Under this latter head are included the systematic hygienic inspections of local authority areas which have not a properly constituted municipal health department. Such local authorities which are not served by a full-time qualified medical officer of health need frequent guidance if gross sanitary faults are to be avoided. The importance of this will be realised when it is borne in mind that only a relatively small proportion of local authorities employ a full-time medical officer of health. Over 400 urban local authorities receive no such expert health guidance. During the year it was only possible for medical officers of the Department to carry out systematic health inspections of 56 such areas. The annual number of systematic inspections of this kind should be over 100 if the original aim of the Department in this connection is to be achieved. No local authority, however small, should be left without expert hygienic advice for more than three years. Much has, however, been done during the year at the smaller centres by means of the public health nurses and inspectors employed by the Department. With the very small body of professional staff available there seems to be little prospect of remedying this serious defect in the health organisation of the country.

#### 2. *Publications by Members of Staff:*—

SIR E. N. THORNTON, *Chief Health Officer.*

“Position in regard to Plague in the Union of South Africa.” Paper read at Pan African Health Conference, Johannesburg, November, 1935. (*Quarterly Bulletin of the Health Organisation of the League of Nations, Vol. V, No. 1, March, 1936.*)

“The Dangers of the Locust Campaign to Human Beings.” Paper read at Pan African Health Conference, Johannesburg, November, 1935. (*Quarterly Bulletin of the Health Organisation of the League of Nations, Vol. V, No. 1, March, 1936.*)

“Hygiene and Medical Services in Rural Areas” (with Dr. A. J. Orenstein, Chief Medical Officer, Central Mining/Rand Mines, Johannesburg). Paper read at the Pan African Health Conference, Johannesburg, November, 1935. (*Quarterly Bulletin of the Health Organisation of the League of Nations, Vol. V, No. 1, March, 1936.*)

DR. G. A. PARK ROSS, *Senior Assistant Health Officer.*

“Climate and Clothing in the Union.” Address to S.A. Medical Congress, Grahamstown, October, 1935. (*S.A. Medical Journal, 23rd November, 1935.*)

“Insecticide as a major measure in control of malaria.” Paper read at Pan African Health Conference, Johannesburg, November, 1935. (*Quarterly Bulletin of the Health Organisation of the League of Nations, Vol. V, No. 1, March, 1936.*)

“Tropical Sanitation in its Application to Native Reserves.” Read at S.A. Health Congress, Capetown, February, 1936. (*Journal of Royal Sanitary Institute, June, 1936.*)

DR. E. H. CLUVER, *Senior Assistant Health Officer.*

“Physical Tests Applied to the White Population of the Union.” (*S.A. Medical Journal, 14th December, 1935. Vol. IX, No. 23.*)

“Typhus and Typhus-like Diseases in South Africa.” Paper read at Pan African Health Conference, Johannesburg, November, 1935. (*Quarterly Bulletin of the Health Organisation of the League of Nations, Vol. V, No. 1, March, 1936.*)



"The Typhoid-carrier Problem in the Union of South Africa." Paper read at Pan African Health Conference, Johannesburg, November, 1935. (*Quarterly Bulletin of the Health Organisation of the League of Nations*, Vol. V, No. 1, March, 1936.)

DR. L. FOURIE, *Assistant Health Officer*.

"Field work against Plague." Paper read at General Meeting of Transvaal Mine Medical Officers Association, January, 1936. (*Proceedings of Transvaal Mine Medical Officers Association*, Vol. XV, No. 171.)

DR. F. P. CLUVER, *Assistant Health Officer*.

"What is our Position in South Africa in regard to Enteric Fevers, their diagnosis and control: The rural and urban Aspects." Paper read at the South African Medical Congress, Durban, June, 1936.

DR. H. S. GEAR, *Assistant Health Officer*.

"Tuberculosis in China: Incidence of the Various Types." (*Chinese Med. J.*, 1935, Vol. 49, p. 446.)

"The Incidence of Venereal Diseases in Hospital Patients in China." (*Chinese Med. J.*, 1935, Vol. 49, p. 1122.)

"A note on Malaria in China." (*Chinese Med. J.*, 1936, Vol. 50, p. 131.)

"The Incidence of Disease in China." [*Chinese Med. J.*, 1936, Vol. 50 (in the Press).]

"Industrial Health in Shanghai, China." (*Chinese Med. Asscn. Special Report*.)

"Chinese Text of above." (*National Med. J.*, 1936, Vol. 21, p. 1143.)

"John Graunt: The Father of Vital Statistics." (a) *South African Med. J.*, 1936, Vol. 10, p. 39. Reprinted (b) *Medical Officer*, Vol. 55, 1936, p. 217.

"Some Shanghai Medical Activities." (*South African Med. J.*, 1935, Vol. 9, p. 859.)

"The Study of Disease Prevalence in China." (*Transactions Royal Soc. Trop. Med. and Hygiene*, 1936, Vol. 29, p. 679.)

"Impressions of Some Medical Institutions of Tokyo, Japan." (*The Leech*, 1936, Vol. 7, p. 35.)

"Some Aspects of Epidemiology." (*The Leech*, 1935, Vol. 6, No. 2, p. 26.)

DR. B. F. SAMPSON, *Government Pathologist*.

"Some Bacteriological Aspects of the Enteric Problem in South Africa"; and with D. F. DREW, *Mkambati Leper Institution*,

"The Treatment of Leprosy." Papers read at the South African Medical Congress, June, 1936 (in the Press).

DR. M. H. FINLAYSON, *Officer in Charge, Biological Control Laboratories*.

"Complement fixation with vaccinal elementary body suspensions and antivaccinal rabbit serum." (*British Journal Exp. Path.*, 1935, XVI, 358.)

"Knoppie-Spider Bite." (*S.A. Med. Journal*, 25th January, 1936.)

"The resistance of four mouse lines to bacterial infection (*Journal Hygiene*, 1936, XXXVI, 37) [with Drs. H. Schutze and P. A. Gorer].

"Lymphogranuloma Inguinale presenting some unusual features" (*S.A. Med. Journal*, 10th August, 1935) [with Dr. F. W. F. Purcell].

In addition to the publications enumerated above numerous addresses on public health subjects were delivered by members of the staff to gatherings convened by local authorities and other organisations.

3. *Health Publicity and Educative Work*.—In Annexure B, pamphlets and leaflets which have been prepared, published and distributed by the Department to date, are furnished.

The following cinema films are owned by the Department and are available to local authorities and public bodies for exhibition purposes:—

"Fly Danger."

"The Trail of a Pesky Fly" (small reel).

"The Rat Menace."

"Your Mouth."

"Tommy Tucker's Tooth."

"The Story of John McNeil" (Tuberculosis) (2 reels).

"Consequences" (Tuberculosis).

"The War on the Mosquito."

"Malaria" (3 reels).

"New Methods for Malaria Control."

"Bilharzia" (2 reels).

"Bilharziosis" (Human Redwater).

"In His Father's Footsteps" (Insanitary Farm: Enteric).

"The Long Haul versus the Short Haul" (Dirty Milk).

"Milk—the Master Builder."

"Drinking Health" (Pure Water) (2 reels).

"London Water Board."

"Preventing the Spread of Disease."

"The Great Crusade" (Shmu Clearance) (2 reels).

"One Scar or Many" (Vaccination).

"Bringing it Home" (Child Welfare).

"Well Born" (2 reels).

"Baby's Bath and Toilet."

- “ The Best Fed Baby.”  
 “ Why Willie was Willing to Wash.”  
 “ Forming the Habits of Health.”  
 “ Camp Sanitation.”  
 “ Any Evening After Work ” (Venereal Disease) (4 reels).  
 “ John Smith and Son ” (Gonorrhoea) (3 reels).  
 “ Peter and the Moon Man.”

A set of small models, specially made for the Department by a health inspector, is stocked by the Department's health officers at Pretoria, Capetown and Durban for loan to local authorities and other bodies for demonstration during “ health weeks ” and on similar occasions, and for illustrating lectures on hygiene. Each set includes a model for illustrating—

- (1) method of rodent-proofing buildings;
- (2) an “ open-air ” room for home segregation of a tubercular patient;
- (3) Baber's maggot-traps;
- (4) Russel's modified maggot-trap;
- (5) Russel's modified box fly-trap;
- (6) Squatting closet for native use.

4. *Laboratories.*—The work done by the Government laboratories at Capetown and Durban and that carried out on behalf of the Government at the South African Institute for Medical Research, Johannesburg, and at Port Elizabeth, is shown in Table D.

TABLE D.—PATHOLOGICAL LABORATORIES: ANALYSES AND EXAMINATIONS, YEAR ENDED 30TH JUNE, 1936.

Particulars.	Laboratories.		South African Institute for Medical Research.	
	Capetown.	Durban.	Jo-hannesburg.	Port Elizabeth Branch.
<i>Specimens Examined for—</i>				
<i>Government Departments—</i>				
Agriculture.....	14	28	—	—
Customs and Excise.....	43	—	2	—
Defence.....	808	27	1,729	—
Interior (Mental Hospitals, etc.).....	986	296	836	57
Justice.....	—	292	1,299	95
Justice (Prisons).....	875	103	1,098	64
Mines (including Miners' Phthisis).....	160	—	12,754	—
Posts and Telegraphs.....	1	1	—	—
Public Health (including Leper Institutions).....	8,355	60,288	45,066	5,460
Public Works.....	1	4	—	—
South African Railways and Harbours	61	2,673	—	—
Other Government Work.....	—	2	458	38
General Hospitals (Provincial).....	2,405	8,188	35,513	6,495
Local Authorities.....	34,271	27,894	5,681	10,685
Medical Practitioners.....	12,149	17,110	21,431	1,685
Department of Education (Provincial).....	—	1,204	—	—
Other Governments or Administrations.....	13	—	154	—
Others.....	215	—	507	24
<b>TOTAL.....</b>	<b>60,357</b>	<b>118,110</b>	<b>126,528</b>	<b>24,603</b>
<i>Manufactures and Issues—</i>				
Autogenous Vaccines.....c.c.	2	25	34,925	6,100
Bacterial Vaccines (stock).....c.c.	—	—	550,270	†
Tuberculin Dilutions.....c.c.	—	—	—	165
Sera (various).....c.c.	—	—	739,618	†
Anti-rabic Vaccine.....c.c.	40,000	—	—	—
Bulgarian Milk Cultures.....bottles	—	—	—	—
Insulin.....tubes	—	—	—	—
Chaulmoogra Oil Preparations.....c.c.	197,250	—	—	—
Smallpox Vaccine—Calf Lymph (prepared at Vaccine Institute, Rosebank).....tubes	1,278,800*	—	132,490	161
Attendances at Courts of Law by Members of Staff.....	131	18	1	2
Total Days' Absence entailed by such attendances.....	172	18	2	4

\* Manufactures only ; 1,391,418 tubes were issued.

† Included in Johannesburg figures.

5. *Biological Control Laboratories.*—During the year a control over the manufacture and importation of *Therapeutic Substances* was initiated in the Union. All laboratories in the Union engaged in the manufacture of such, including laboratories in which autogenous vaccines only are made, were inspected before a licence to manufacture therapeutic substances was granted. In certain cases it was found necessary to recommend that additional sterilising equipment and storage accommodation be provided before a licence



was granted. In general it may be said however that the laboratories licensed for the manufacture of therapeutic substances, including autogenous vaccines, in the Union, compare favourably with any in the world.

A number of agents were licensed during the year to import therapeutic substances into the Union. The premises of all these importers were inspected and in each case where a therapeutic substance other than surgical catgut was imported and stored for a period of more than three months, the provision of adequate cold storage was insisted on as a condition of granting of a licence. In addition a number of research licences were granted to properly qualified persons working in a recognised scientific institution to enable them to import therapeutic substances into the Union for the purposes of scientific research.

The number of licences issued under the Therapeutic Substances Regulations, Government Notice No. 1131 of 1935, is shown in Table E (i).

TABLE E (i).—LICENCES ISSUED UNDER THE THERAPEUTIC SUBSTANCES REGULATIONS, GOVERNMENT NOTICE, No. 1131 OF 1935.

Therapeutic Substances.	Manufacturing Licences Issued.	Import Licences Issued.	Research Licences Issued.
Antitoxic and bacterial sera.....	2	6	10
Antigens and Bacterial.....	11	12	10
Vaccines.....	11	12	10
Arsphenamines and Derivatives.....	—	5	10
Insulin.....	—	10	10
Pituitary (Posterior Lobe) Extract.....	—	11	10
Sterilized Surgical Ligatures and Sutures.....	—	6	10

Samples of therapeutic substances both manufactured in and imported into the Union were examined in the newly established Biological Control Laboratories. These examinations were carried out under the Therapeutic Substances Regulations, which were promulgated under Government Notice No. 1131 on 9th August, 1935, and are summarized in Table E (i).

TABLE E (ii).—EXAMINATIONS CARRIED OUT UNDER THE THERAPEUTIC SUBSTANCES REGULATIONS.

Name of Product.	Manufactured in the Union. No. examined.	Imported into the Union. No. examined.	Number unsatisfactory.
Bacterial Vaccines.....	9	7	—
Schick Test Toxin.....	12	2	5
Diphtheria Prophylactic.....	3	2	—
Tubereulin.....	—	—	—
Anti-Dysentery Serum Shiga.....	2	—	—
Diphtheria Antitoxin.....	7	7	4
Tetanus Antitoxin.....	5	3	3
Gas-gangrene Antitoxin Perfringens.....	2	1	1
Arsphenamine and Derivatives.....	—	—	—
Insulin.....	—	—	—
Pituitary (Posterior Lobe) Extract.....	—	5	1
Sterilized Surgical Sutures.....	—	5	—
Total Number of Samples Examined.....	40	32	14

In addition a number of samples of *Digitalis Pulverata* B.P. and *Tinctura Digitalis* B.P., were examined in the laboratories under the provisions of sub-section (1) of section 5 of Act No. 13 of 1929. The results of these examinations are shown in Table E (iii).

TABLE E (iii).—EXAMINATIONS CARRIED OUT UNDER THE FOOD, DRUGS AND DISINFECTANTS ACT, No. 13 OF 1929.

Name of Product.	No. Examined.	No. Unsatisfactory.
Digitalis Powder B.P.....	3	2
Tinct. Digitalis B.P.....	18	4
Total Number of Samples Examined.....	21	6

It will be noted that of 72 samples of therapeutic substances examined, 14 were found to be unsatisfactory in that they did not comply with the conditions governing the potency or toxicity of therapeutic substances as laid down in the Regulations. In the case of Diphtheria, Tetanus and Gas-gangrene antitoxins, the unsatisfactory samples were found to contain insufficient excess of antitoxin to enable the sample to retain the potency stated on the label, for the period during which the manufacturer stated the sample would retain its full antitoxic value. In the case of Schick Test Toxin samples examined, the unsatisfactory samples were found to contain either excess or deficiency of toxin. The unsatisfactory sample of Pituitary (Posterior Lobe) extract was found to contain a marked deficiency of active oxytoxic principle. The samples of *Digitalis Pulverata* B.P. and *Digitalis Tinctura* B.P. reported unsatisfactory were found to possess less than 80 per cent. of the activity of a tincture of digitalis prepared from International Standard Digitalis Powder, the comparison being carried out as laid down in the British Pharmacopoeia 1932.

In addition to the examinations reported above, research on problems dealing with the standardisation and examination of therapeutic substances has been carried out in the Biological Control Laboratories. Preparations of antivenenes have been prepared with a view to issuing provisional standards for Cape Cobra Antivenenes and Puff Adder Antivenenes. Experiments have also been carried out to determine the extent of the deterioration of commercial samples of Tincture of Digitalis kept under different conditions. The experiments are still in progress. Further, research has also been initiated with a view to devising a method of digesting commercial catgut to liberate bacterial spores present in the interior of the gut. Promising results have been obtained by using Papain as a digesting agent, for, whilst samples of catgut are readily digested by this enzyme, bacterial spores appear to be unaffected by its action.

Research has also been carried out on Typhus, on Lymphogranuloma Inguinale and on spider bite. The results of these investigations are detailed in the relative sections of the report.

The rapidly widening field of endocrine therapy has led to the development of many hormone preparations which can only be assayed by biological tests. It is hoped that some control of these preparations sold in the Union may be instituted during the coming year. In addition the assay of vitamin-containing products is urgently required. The rapid development of the pharmacological activities of the Biological Control Laboratories necessitates the appointment of a full-time pharmacologist who may also act as deputy officer-in-charge of the laboratories. It is hoped that this appointment may be made in the near future.

*Research.*—Following the resolution passed by the Council of Public Health, an attempt was made to obtain strains of *Typhus virus* from various areas throughout the Union. The year 1935-36 was not characterised by any severe outbreaks of typhus in the Union. As, in order to collect strains of virus, it is necessary for an officer to proceed to the typhus-ridden area to inoculate animals on the spot, few opportunities of acquiring new strains presented themselves in view of the limited outbreaks which occurred during the year. Following on a case of typhus reported at Klein Drakenstein a strain of murine typhus was isolated from rats obtained from the affected area. No other strains were isolated during the year and investigations were carried out on this strain with a view to determining the virus concentration in various organs in infected animals and also to devise a method of isolating the virus in vitro. These investigations are still in progress.

6. *Port Health Administration.*—Strict supervision is kept at all ports to preclude the possibility of infection being introduced into the country from ships entering our waters. The health work carried out in this connection is shown in summary in Annexure C to this report.

No cases of any of the major infectious diseases—cholera, plague, small-pox, yellow fever or typhus were introduced into our ports by ships during the year.

All vessels arriving from ports which are known to be or suspected of being plague infected were systematically examined. Fumigation of rodent-infested ships is carried out at Durban which is recognised as one of the principal fumigation ports of the world.

The troublesome incidence of measles among children on immigrant ships reported in previous years has practically vanished because of the action of the Brazilian Government in very considerably reducing the quota of Japanese immigrants entering Brazil. The outbreaks of measles on ships were largely confined in the past to these immigrants.



## V.—INFECTIOUS AND PREVENTABLE DISEASES.

1. *Notifications.*—In Table F are shown the numbers of infectious diseases notified by medical practitioners during the year, the totals for the previous year being inserted for comparison. This table does not by any means give a correct statement of the numbers of notifiable diseases which have occurred as many cases of such diseases, particularly when occurring among natives, are never seen by a medical practitioner, and are consequently not notified:—

TABLE F.—NOTIFICATION OF DISEASES BY MEDICAL PRACTITIONERS DURING THE YEARS ENDED 30TH JUNE, 1935, AND 30TH JUNE, 1936.

Disease.	Year Ended 30th June, 1936.													
	Year Ended 30th June, 1935.		Union.		Cape Province, excluding Transkei.		Transkei.		Natal.		Orange Free State.		Transvaal.	
	Union.	Total.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.
Anthrax.....	54		79	10	8	1	19	4	1	5	10	4	17	
Diphtheria.....	1,749		1,741	534	316	15	12	320	104	65	17	321	37	
Encephalitis, Infective.....	42		32	8	9	—	1	—	—	—	—	5	9	
Enteric or Typhoid Fever.....	4,377		4,404	542	629	10	122	118	209	86	218	679	1,791	
Erysipelas.....	434		532	116	67	3	3	24	9	24	5	186	95	
Lead Poisoning.....	4		11	11	—	—	—	—	—	—	—	—	—	
Leprosy.....	112		755	6	59	—	236	2	135	4	39	2	272	
Malta Fever.....	36		15	—	2	—	—	—	—	—	—	7	6	
Meningitis, Epidemic Cerebro-spinal.....	532		630	51	133	—	2	17	25	4	10	149	239	
Ophthalmia, Gonorrhoeal.....	72		79	9	49	—	—	2	6	—	3	3	7	
Ophthalmia Noenatorum.....	415		410	47	260	—	2	4	6	5	10	53	23	
Plague [for detailed list of cases and deaths, see Table I (i)].....	290		253	4	34	—	—	—	—	14	178	—	23	
Poliomyelitis, Acute.....	61		26	7	8	—	1	1	2	—	—	2	5	
Puerperal Fever, including Puerperal Sepsis..	438		469	71	162	1	7	9	24	4	13	103	75	
Rabies.....	3		9	1	4	—	—	—	—	1	—	2	1	
Scarlatina or Scarlet Fever.....	1,964		2,569	992	20	4	2	197	—	186	1	1,145	22	
Smallpox (for detailed list of cases and deaths, see Table J).....	29		24	—	1	—	—	—	4	—	4	—	15	
Trachoma.....	48		66	6	23	—	—	3	10	—	—	5	19	
Tuberculosis.....	8,896		8,755	511	4,279	1	955	143	1,270	28	186	109	1,273	
Typhus Fever [for detailed list of cases and deaths, see Table L (iv)].....	6,826		1,605	20	488	—	327	13	20	3	277	4	433	
TOTALS.....	26,382		22,464	2,946	6,551	35	1,689	857	1,825	429	971	2,779	4,382	



2. *Bilharziasis*.—The damage to health of large sections of the European and non-European population in the low levels of the Transvaal and Natal is difficult to estimate. That persons suffering chronically from bilharziasis become necessarily inferior citizens is definitely recognized. Every effort should therefore be made to combat this disease. The first essential in an anti-bilharzial campaign is an accurate survey of the affected areas. It is necessary to know the exact distribution of the carrier snails and the extent to which they are infested with bilharzia worms. This latter depends in turn on the extent to which the population of the area is infested with the worms and the degree of their insanitation. Snails can only become infested with the worms as the result of bilharzia eggs voided by human sufferers reaching water.

Such a survey is now in progress. It is being conducted by the malaria field staffs of Natal and Transvaal as opportunity offers during the course of their immediate duties in connection with malaria which is a more serious national problem. Some very useful data has already been collected in this way in the Eastern Transvaal. The area surveyed lies east of the Drakensbergen between the Komati and Olifants rivers. Portions of the majority of the bigger rivers and their tributaries were searched and some 1,200 snails collected. Notes were made of all these snails regarding their habitat and the species.

This information may be summarised as follows:—

Snail.	Number Collected.	Running Water.				Standing Water.			
		(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)
<i>B. forskalii</i> .....	169	—	—	9.6	—	14.3	15.4	60.7	—
<i>L. natalensis</i> .....	364	21.1	33.3	—	0.2	33.4	10.7	0.2	0.4
<i>M. tuberculata</i> .....	27	—	37.0	3.7	—	—	51.9	7.4	—
<i>P. africana</i> .....	152	7.0	18.0	9.0	—	48.0	18.0	—	—
<i>P. costulatus</i> .....	63	4.8	81.0	4.8	—	3.1	6.3	—	—
<i>D. pfeifferi</i> .....	483	5.0	15.8	1.8	0.2	14.6	59.0	3.4	0.2
<i>S. patentissima</i> var <i>lomatiensis</i>	2	—	100.0	—	—	—	—	—	—
TOTAL.....	1,260	—	—	—	—	—	—	—	—

The lettering at the head of the columns indicates the percentage of snails in each case attached to (a) vegetation; (b) rocks; (c) earth or mud; (d) dead wood.

This table does not include any collections made by native school children, which in one case amounted to 253 *Physopsis africana* and some *Limnaea natalensis* collected from one stream in about an hour.

Though the survey has only just started it reveals a very wide distribution of all the South African snail hosts of *Schistosoma mansoni* and *Schistosoma haematobia* with the exception of *B. tropicus* which has not been seen at all.

There appears to be no evidence of snails being dependent upon certain types of vegetation for sustenance. That they favour lily leaves and the like was evident, but if these are removed the snails attach themselves to any other vegetation, rocks or mud in the vicinity. This is very noticeable when irrigation furrows are cleaned out. On one occasion numerous *B. forskalii* and *P. africana* were observed and appeared to be quite at home on the mud bottom and sides of a furrow which had recently been cleared of all vegetation. *Planorbis pfeifferi* occurs abundantly on vegetationless rocks (59 per cent.) whilst *B. forskalii* appears to favour rocks or earth in standing water.

No attempt was made to determine the extent to which snails were infected in nature, the difficulty being the careful technique and time necessary for the proper identification of cercariae; to judge from the results of workers in other parts of the world it would appear that the infection rate in snails is usually proportionate to that of human beings in the locality. It is therefore of more value to obtain an index from the human population, the determination of the susceptibility to infection of the various snails being left meanwhile until better facilities for carrying out this work become available.

*B. forskalii* has been found to be more widespread than was hitherto supposed, and if, in the future, this species is found to be as easily infected here as it has been shown to be in Mauritius, it will prove just as big a problem to deal with as *P. africana*.

During the year a bilharzia survey was made of 21 native schools with a total of 726 children. Of these 458 or 63.6 per cent. were found to be



infected, ova of *S. haematobia* being present in the urine. The individual school infection rate ranged from 10 per cent. to 100 per cent. Faeces of 10 children were examined and in one case ova of *S. mansoni* were found. This was at Bushbuck Ridge. At Emangweni on the Lebombo Flats a double infection, i.e., *S. haematobia* and *S. mansoni* was found in urine. In addition 20 Europeans and 39 natives were examined. Eleven or 55 per cent. and 37 or 39 per cent. respectively were found to be infected with ova of *S. haematobia*.

The schools visited were mostly in the vicinity of the Selati Railway line between Komatipoort and Klaserie but schools at White River, Bushbuck Ridge and along the Swaziland border were also visited.

Several European treatment camps have been held in this district in the last decade and, though there are still many Europeans suffering from bilharzia, some of which are reinfections after having been treated, the position is much improved. The usefulness of these camps is limited because the sources of potential reinfection are not removed at the same time. Such an organized camp does, however, reduce the incidence of the disease, and alleviates suffering, and, at the same time, it has valuable propaganda value. Natives welcome treatment as also do the farmers who have to rely on these bilharzia-ridden areas for their labour supply. District Surgeons are able to treat a few native cases on their periodical visits to the localities in which such natives reside; but the value of such work is negligible.

During the dry, hot weather the streams in the regions more seriously affected dry up into series of pools. These pools carry the snail population in concentration and it requires little imagination to appreciate that with persons coming into such close contact with the masses of parasites given off by the snails, why the infection is so heavy in such localities. The heaviest sufferers are undoubtedly the natives; attempts are being made through the schools to educate them in preventive measures. A native spotter has lectured to most schools and the mode of infection, etc., has been explained to all children during the survey.

Much has been written about the fruit of the tree *Balanites egyptica* as a means of combating bilharzia. In South Africa there is an indigenous species of *Balanites* (*maughami*) which grows in the lowveld. The fruit of this species too has been shown to be lethal to both snails and cercariae in certain concentrations. The value of this tree as it grows naturally in South Africa must be considered as very doubtful for the following reasons:—

- (1) The tree is extremely slow growing; the attempt which is being made at the Nelspruit Horticultural Research Station to grow the South African species has served to demonstrate its slow growth.
- (2) Water is only rendered free of snails and cercariae whilst the fruit is actually falling into it and giving off its lethal properties. In the case of *Balanites maughami* the fruit begins to ripen in midwinter and continues to fall until September, the period when swimming is at its minimum and action against the snails and cercariae least needed.
- (3) The tree in its natural state is never found near water.

Dr. Mönnig, of Onderstepoort, is having the fruit analysed to determine the lethal principles. This may lead to the production of another *anti-snail-cercariae* substance preferable to copper sulphate which could be used without fear of harm to humans or animals. It has been observed that impala in the Kruger National Park eat the fruit with relish.

Propaganda has resulted in many risky swimming places becoming less popular and individuals taking keener interest in preventive measures. The main measure of protection is to swim in treated baths or pools and many farmers and others have sought advice in this regard. There are many private swimming baths in the White River district and numerous irrigation dams both here and elsewhere. The treatment of these to eliminate risk of infection is increasing and it is hoped that before long this method of preventing bilharzia will be used more generally. Irrigation dams make ideal swimming pools and they are as a rule easily treated.

*Transvaal Bilharzia Committee.*—The work of the Transvaal Bilharzia Committee, on which the Transvaal Education Department, the South African Red Cross Society and this department are represented, has continued actively during the year. Financed by this department an additional cinema film was prepared and is now being used for educative purposes in affected areas.

Three treatment campaigns were organised in co-operation with the School Medical Officers of the Transvaal Education Department. At all these centres, foudrin was used in preference to other drugs for the following reasons:—



- (a) Convenience of handling;
- (b) conviction of the School Medical Officers that it is a drug with which bilharziasis can be cured if it is used with the necessary caution and common sense required in a medical practice in general;
- (c) that, although antimony tartrate preparations may give a higher percentage of cures, the use of foudadin obviates the necessity of organising large treatment camps on more or less hospital lines.

The first treatment centre was arranged in the form of a camp at Sonop School in the Brits area. It was organised because of the possibility that the Department of Irrigation would aid in the establishment of swimming baths at a number of schools in this neighbourhood, but unfortunately these baths did not materialise. All school children in this neighbourhood were examined for bilharziasis and 78 were found to be infected, viz. 68 boys and 10 girls. Of these 78, 58 reported for treatment, but only 54 completed the course. Of these, 50 were free from ova and blood, and 4 were doubtful at the close of treatment. On re-examination within three months after treatment only 46 cases could be traced, the others having left school. Of the 46 cases re-examined, 38 cases showed no signs of infection—the others were either still doubtful or positive. The 46 cases re-examined included 43 cases that had been discharged as negative but 6 of these were again showing signs of bilharziasis, i.e. microscopic blood in urine. Of the 54 cases that completed the course of injections, 38 can definitely be regarded as cured, i.e. 70·3 per cent.

The second treatment centre was organised at the Pretoria School Clinic during the 1935-1936 summer vacation. These children all came from the Silverton School where bilharziasis is fairly prevalent because of the fact that the spruit which runs through this township is infested. Forty-six cases of bilharziasis were found in the Silverton School, and of these 32 were treated; on re-examination 21 cases were found to be free from bilharziasis, a percentage of cure of 65·6.

The third treatment campaign was undertaken in connection with a medical inspection tour of the Zwarttruggens area. One-hundred-and-two cases from various schools in this area completed a course of treatment and of these, 84 were found to be cured on re-examination giving a percentage of 82·3. During this Zwarttruggens treatment campaign an attempt was made to treat native children, but the results were somewhat unsatisfactory on account of the reluctance of the children to submit themselves to a long period of injections. Thirteen native children reported for injection and only 7 kept up the attendance till the eleventh injection. Two received 9 injections, the rest absconding earlier. Of the 7 who had received 11 injections, 6 were re-examined, 3 were free from ova and blood, and 3 had only blood in the urine.

As one of the best practical means of preventing bilharziasis in school children is to provide a safe swimming pool at schools situated in endemic areas, the Transvaal Bilharzia Committee arranged for swimming pools to be established at the following schools:—Louis Trichardt, Groot Marico, Doornfontein No. 389, Logieskop, Kafferskraal No. 352; while at the following places baths are being erected: Rietfontein No. 299, Rodekrans, Mezeg-Enselsberg and White River. The future policy of the Committee in this direction, will be to encourage the erection of small swimming baths in endemic bilharzia areas as far as possible.

3. *Enteric or Typhoid Fever.*—This disease, which depends for its existence on contamination of our food with faeces from infected persons, and should therefore be entirely preventable, continues to take a heavy toll. Last year 4,384 cases were notified; of these, 2,949 or approximately only two-thirds were non-Europeans. When it is remembered that the non-European population of the Union outnumbers the European by about three to one, and that conditions of insanitation are in general very much worse among the former than among the latter, it at once becomes evident that the notification for non-Europeans must greatly underestimate the real incidence of typhoid in South Africa. It is also probable that the figure for Europeans is an underestimate as many mild or atypical cases go unrecorded. The notifications for the past ten years (for twelve-month periods ending 30th June) were as follows:—

1927	...	...	...	...	...	...	...	...	4,018	cases.
1928	...	...	...	...	...	...	...	...	5,787	„
1929	...	...	...	...	...	...	...	...	4,963	„
1930	...	...	...	...	...	...	...	...	3,775	„
1931	...	...	...	...	...	...	...	...	4,793	„
1932	...	...	...	...	...	...	...	...	4,505	„
1933	...	...	...	...	...	...	...	...	4,389	„
1934	...	...	...	...	...	...	...	...	8,267	„
1935	...	...	...	...	...	...	...	...	4,377	„
1936	...	...	...	...	...	...	...	...	4,384	„

The distribution of the cases reported during the year is shown in Table G (i).

TABLE G (i).—ENTERIC OR TYPHOID FEVER: CASES REPORTED DURING THE YEAR ENDED 30TH JUNE, 1936.

	EUROPEAN.	NON-EUROPEAN.
Cape Province (excluding Transkei).....	542	629
Transkei.....	10	122
Natal.....	118	209
Orange Free State.....	86	218
Transvaal.....	679	1,791
TOTAL.....	1,435	2,949

As in previous reports, the incidence of typhoid in certain local authorities is tabulated [Table G (ii)]. Typhoid fever only occurs as the result of insanitation, and therefore local authorities high up on this list have this eloquent testimony of the results of imperfect hygienic procedures in their area.

TABLE G (ii).—ENTERIC OR TYPHOID FEVER—NOTIFICATIONS AND INCIDENCE IN CERTAIN LOCAL AUTHORITY AREAS DURING THE YEAR ENDED 30TH JUNE, 1936 (ARRANGED IN ORDER OF INCIDENCE RATE)—EXCLUDING CASES RETURNED AS "IMPORTED".

Local Authority.	Notifications.			Incidence per 1,000 of Population.		
	European.	Non-European.	Total.	European.	Non-European.	All Races.
Clanwilliam.....M.	6	39	45	11.21	42.4	30.92
Nigel.....M.	1	298	299	0.21	17.28	14.02
Beaufort West.....M.	39	32	71	11.14	7.4	9.1
Uniondale.....M.	10	1	11	16.25	1.44	8.39
Alice.....M.	—	22	22	—	10.00	7.48
Hercules.....M.	21	17	38	3.84	4.91	6.58
Heilbron.....M.	4	22	26	2.60	8.98	6.52
Heidelberg (T).....M.	14	22	36	6.05	6.36	6.23
Glencoe.....M.	19	1	20	15.10	0.48	6.00
Verulam.....Tn. Bd.	—	11	11	—	6.75	5.91
Alexandra.....H.C.	—	88	88	—	5.29	5.29
Standerton.....M.	5	19	24	2.14	5.92	4.33
Ficksburg.....M.	18	2	20	7.20	0.80	3.92
Piet Retief.....M.	7	3	10	6.01	1.58	3.27
Robertson.....M.	7	9	16	2.32	4.70	3.25
Springs.....M.	16	250	266	0.87	3.65	3.06
Burghersdorp.....M.	1	13	14	0.48	4.7	2.9
Benoni.....M.	51	162	213	2.43	2.57	2.54
Volksrust.....M.	3	9	12	2.02	2.75	2.52
Ermelo.....M.	10	2	12	2.70	0.88	2.50
Ladybrand.....M.	7	4	11	2.90	1.66	2.34
Oudtshoorn.....M.	17	11	28	2.62	1.64	2.12
Brakpan.....M.	24	85	109	1.39	2.28	2.00
Kroonstad.....M.	3	23	26	0.57	2.85	1.95
Queenstown.....M.	2	29	31	0.30	2.55	1.72
Krugersdorp.....M.	17	66	83	0.94	1.85	1.55
Cradock.....M.	6	8	14	1.64	1.45	1.52
Boksburg.....M.	—	71	71	—	2.08	1.42
Paarl.....M.	14	12	26	1.59	1.23	1.40
Germiston.....M.	12	64	76	0.47	1.54	1.13
Randfontein.....M.	1	32	33	0.19	1.32	1.12
George.....M.	10	1	11	1.94	0.15	1.11
Pretoria.....M.	50	60	110	0.73	1.50	1.02
Rodepoort.....M.	6	31	37	0.57	1.01	0.89
Johannesburg.....M.	144	199	343	0.58	1.05	0.78
Uitenhage.....M.	5	10	15	0.54	0.89	0.73
Port Elizabeth.....M.	33	31	64	0.68	0.62	0.65
Vereeniging.....M.	4	7	11	0.85	0.50	0.58
Capetown.....M.	51	78	129	0.34	0.54	0.44
Bloemfontein.....M.	4	18	22	0.17	0.63	0.42
Pietermaritzburg.....M.	11	7	18	0.51	0.28	0.38
East London.....M.	5	10	15	0.23	0.40	0.32
Durban.....M.	24	20	44	0.27	0.13	0.19

M.= Municipality. Tn. Bd.= Town Board. H.C.= Health Committee.

All rates calculated on population as at Census, 1936, and the figures are therefore preliminary.

It is because of the very large number of typhoid carriers particularly among our native population that insanitation, more particularly with regard to the disposal of excremental matter, is so quickly punished by typhoid prevalence. Unless the measures adopted are very efficient, food,



especially milk and water supplies, become contaminated. It is well-nigh impossible to supervise the cleanliness of every individual; that is why even with the best sanitary services typhoid cases will still occur because of uncleanly habits of individual unsuspected carriers. Control of carriers is one of the most difficult problems in public health. Much thought was given to it at the Pan African Health Conference in November. That Conference recommended—

- (1) that further research be undertaken in the use of vaccines for the sterilization of carriers;
- (2) that improvements in the conditions of milk production and distribution combined with efficient pasteurisation of milk on a wide scale must be insisted on in Africa.

Vaccination against typhoid is extensively carried out especially when there is a threat of a severe outbreak. The endotoxoid vaccine prepared by the South African Institute for Medical Research is being increasingly used, particularly on the Witwatersrand mines, on public works, and various isolated communities. Over 100,000 native mine workers have already been immunized with this vaccine. Among the advantages claimed for this new method are the absence of unpleasant reactions and the high degree of immunity produced; its use appears to have been characterized by a rapid and permanent reduction of enteric among immunized subjects.

4. *Leprosy*.—No noteworthy changes have taken place regarding the various aspects of leprosy control and treatment. Of recent years the number of early cases of leprosy entering Leper Institutions has certainly increased, but the number of cases which are only discovered or certified after they have suffered from the disease for years is far too large—a fact which militates against the value of curative treatment.

Various methods of treatment were again tried out. Although the chaulmoogra group oils and their ethyl-esters cannot be considered as specific against leprosy, yet the number of cases showing improvement or arrest under their administration, outnumber those who do so spontaneously or under other forms of treatment. Various drugs which gave initial promise of success elsewhere, notably the aniline dyes and their compounds like methylene blue, trypan blue, brilliant green, mercurochrome, etc., were further tested with disappointing results. These results were confirmed by research workers in other parts of the world. Chaulmoogra oil and its derivatives still hold place of honour in our armamentarium against leprosy.

Dr. Davison at Emjanyana has been obtaining results by treatment with ethyl esters which, so far, have been unsurpassed in the Union. There can, I think, be no doubt but that the ethyl ester treatment, if properly given to certain types of cases, undoubtedly plays a very important rôle in securing the arrest of the disease.

The problem of experimentally conveying the disease to human beings and laboratory animals still remains unsolved, although the reported success of Professor de Langen, of Java, to convey super-infection experimentally to naturally infected lepers has stimulated further research work along those lines.

The studied opinion of most competent bacteriologists and leprologists is that the successful culture of the *Mycobact leprae* on artificial media remains unaccomplished.

Many important factors in the epidemiology and spread of leprosy remain unexplained. In spite of the truly colossal amount of laboratory and field research work done by competent workers all over the world since the discovery of the causal organism by Hansen in 1878, the intervening period has been barren of results, except of a negative kind. This does not imply that valuable data have not been gathered or that the fate of lepers has remained unaltered. The forward march in the knowledge of other infectious diseases generally, the successful scientific application of this knowledge to various operating factors in their epidemiology, prevention and control, together with the enormous growth of health services throughout the civilised world, and the ease of exchanging knowledge between one group of investigators and another, have been applied in the domain of leprosy and have done more to bring about the present enlightened and humane methods of dealing with lepers than actual leprosy research work as such.

In spite of the fact that 99 per cent. of lepers under institutional care are better fed, clothed and housed than they have ever been before, that they have veritably found asylum in the true sense of the word, and that their dependents are provided for, resentment at their segregation and isolation from the rest of the community still remains. The number of lepers who come forward voluntarily for segregation and treatment still remains small, but the number shows a steady and encouraging increase.



Interruption of a course of treatment or non-attendance for treatment at all is a frequent occurrence. There are certain types of leprosy which respond to no form of treatment, and it is not altogether surprising that a certain percentage of lepers becomes despondent and resorts to quack remedies on which they waste their money. It is, however, very regrettable that among those who do not attend regularly for treatment are often to be found cases who would definitely benefit from treatment if they attended regularly and did not lose heart.

Apart from specific anti-leprosy therapy a great deal can be done by paying attention to the patients generally, such as attention to concurrent diseases, insisting on fresh air, suitable diet, regular baths, personal cleanliness and occupation mentally and physically. Once the general health of the patient has been worked up to a high level, there is reason to believe that specific treatment succeeds best when successive well controlled slight reactions are induced. Provided no intercurrent infections are present, the patient's progress can be watched by doing regular red-cell sedimentation rates. The standard treatment consists of weekly subcutaneous injections of chaulmoogra oil and/or iodised ethyl esters injected into the macules themselves. The quantities are determined by the reaction of each individual patient. In addition chaulmoogra ointment is used for inunction and finds great favour with the native patients.

In Tables H (i) and H (ii) are shown the numbers of lepers in Institutions and those remaining in their own homes at the end of June, 1936.

TABLE H (i).—LEPER INSTITUTIONS: PATIENTS THEREIN ON 30TH JUNE, 1936.

Institution.	Europeans.		Native.		Mixed Coloured.		Asiatic.		TOTAL.		
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	Persons.
Pretoria.....	70	34	421	254	64	32	2	3	557	323	880
Mkambati.....	—	—	114	103	—	—	—	—	114	103	117
Emjanyana.....	—	—	340	307	—	—	—	—	340	307	647
Amatikulu.....	—	—	241	157	—	—	—	—	241	157	398
Bochem.....	—	—	40	35	—	1	—	—	40	36	76
TOTAL.....	70	34	1,156	856	64	33	2	3	1,292	926	2,218

TABLE H (ii).—LEPROSY: CASES REMAINING IN THEIR OWN HOMES ON 30TH JUNE, 1936.

	Certified and Awaiting Removal to Leper Institution.	Home Segregated.	Probationally Discharged from Leper Institutions.		Total.
			Still under Surveillance.	Released from Surveillance.	
Cape (Province proper).....	—	2	141	350	493
Transkei.....	43	1	606	652	1,302
Transvaal.....	2	1	592	512	1,107
Natal.....	20	—	291	424	735
Orange Free State.....	1	—	103	118	222
UNION.....	66	4	1,733	2,056	3,859

5. *Malaria*.—Owing to its extensive distribution over Africa and its very harmful economic effects, malaria received the very serious consideration of the Pan African Health Conference of the League of Nations held in Johannesburg in November.

With the exception of certain highland areas and a large region comprising the more southerly parts of the Union, malaria occurs throughout almost the whole of the continent of Africa. The disease is mostly highly endemic, in many parts hyperendemic, affecting many millions of the population. The effect of the disease on these millions of people considered as a whole cannot yet be measured, but enough work has been done and enough experience gained to satisfy the Conference that malaria occupies one of the foremost places—if indeed, not the foremost—among the infective diseases of Africa as a cause of mortality and morbidity in the indigenous populations, and that, as such, it plays an outstanding part in hindering the progress and social development of these peoples and in retarding the advancement of industry and trade.

From the discussion at the Conference it emerged that the prevention or control of malaria in Africa had, for the most part, though with some notable



exceptions, been attempted only in the case of populations inhabiting comparatively circumscribed areas—for example, in towns and at ports, on plantations, in connection with large engineering or industrial projects, or in some areas of European farming settlement. It was felt that much more was required, the outstanding problem now being to devise methods of lessening the incidence of the disease among the great indigenous rural populations of the continent. Of first importance is the improvement of the economic status of the African peasant. Our knowledge of malaria as a disease and of the bionomics of the dangerous anophelines of Africa, is still faulty and needs to be improved.

Though great economic advance may, in the long run, largely depend on the control of malaria, all anti-malaria measures of whatever nature, whether domestic or general, must involve some expenditure, however small, and should be accompanied by, or may even depend upon, a great measure of improvement in the nutrition and housing of the people. The means of expenditure, even on a small scale, and anything in the nature of an adequate, regular and well-balanced dietary are, however, things not yet within the compass of the average native of Africa, and economic advance is therefore an essential preliminary.

As regards knowledge of malaria, the Conference stressed the need for further study of malaria as a disease, of the reaction of African man to the infection under African conditions, and of the ultimate results of such infection; for study of the strains of the malaria parasite in Africa and the action of various therapeutic remedies on the various strains; for study of the bionomics of the dangerous anophelines in various parts of Africa and the possibility of the occurrence of varieties of these species.

The Conference had before it an account of the large experiment being carried out in the Union on the control of malaria in rural areas by means of the destruction of adult mosquitoes with insecticidal sprays, and the hope was expressed that this experiment would be continued.

It was decided that consideration be given to the possibility of holding from time to time malaria courses in Africa for the study of malaria and of its prevention and control under African conditions.

Finally the question of economic advancement was again stressed, and the Conference recommended that while research along the lines suggested was an urgent matter, it should not be forgotten that, without raising the economic status of the vast bulk of the population of Africa as a whole, there could be no hope of applying the results of research on a continental scale or of improving the position of great populations with regard to malaria as a disease.

*A. Malaria Control in Natal and Zululand.*—The malaria season was preceded by a prolonged drought which continued until the beginning of February. The effect of this dry spell was not so marked in areas south of the Umfolosi River over which abnormal rains had fallen in June, 1935. In the areas north of the Umfolosi River, however, the country was largely denuded of surface vegetation and this was particularly noticeable in the Native Reserves. The larger rivers such as the Umfolosi and Mkuzi had ceased to flow, while the smaller tributaries had dried out entirely, leaving a series of disconnected pools in their courses. With the advent of rains conditions became peculiarly favourable for the breeding of *Anopheles gambiae* which is primarily responsible for the annual seasonal incidence of malaria in this Province. The rains succeeding the dry spell created innumerable exposed puddles in which *A. gambiae* bred prolifically.

During February and March the hot, humid weather conditions interspersed with frequent showers presented ideal conditions for the rapid multiplication of the malaria vector. The result was that breeding of *A. gambiae*, which prior to the rains had been confined to the river valleys and certain low-lying areas in Zululand and Natal, began to extend rapidly and numerous fresh breeding foci appeared. Towards the end of February, adult *A. gambiae* were found in human habitations in considerable numbers particularly in the coastal and inland areas of Zululand and in certain low-lying areas on the Natal coast.

Towards the middle of March breeding of *A. gambiae* was prolific particularly in the former drought stricken areas of Zululand and in the north eastern districts of Natal where no organised control measures had been instituted.

The incidence of malaria prior to the rains in February had been the lowest for the past five years. The distribution of cases, however, remained as for previous years, extending from the coast areas as far south as Port Shepstone and inland areas up to an altitude of 2,500 feet. With the increased humidity following the rains fresh infections began to occur in the hitherto uncontrolled districts of Zululand and northern Natal bordering on the eastern endemic areas. Out of a total of 337 positive blood smears examined during the past season, 190 or 56 per cent. came from these



uncontrolled areas. The remaining 147 represented sporadic cases throughout the rest of the Province.

The following table shows the number of positive blood smears examined by the Government laboratory at Durban and reflects the position in respect of each calendar month since August, 1931:—

Season.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April.	May.	June.
1931-32....	—	15	14	24	20	40	67	159	613	1,334	915	588
1932-33....	178	95	79	96	103	143	225	515	975	1,055	837	404
1933-34....	95	46	33	39	30	37	120	344	826	935	514	237
1934-35....	66	46	35	35	22	33	37	29	38	44	38	3
1935-36....	4	10	4	9	11	5	7	3	59	114	61	50

The extensive locust campaign instituted by the Agricultural Department in Northern Zululand undoubtedly contributed to the increased incidence of malaria during the season. This campaign was carried out mainly in the endemic areas of Zululand where from 300 to 400 susceptible Europeans were employed at the height of the malaria season in March and April without regard to essential precautionary measures and it is conservatively estimated that approximately 50 per cent. of those employed contracted the disease. While comparatively few reported sick on the job, many were diagnosed by blood smears on return to their homes throughout Natal and Zululand. The fact that no local outbreaks occurred on the return of these carriers to areas under control even where vectors were numerous emphasises the efficiency of the measures in force in such controlled areas.

It will be noted from the above recorded figures that as a result of the activities of the Department supported by the co-operative efforts of local authorities, malaria committees and voluntary committees, the incidence of malaria in this Province has dwindled to very small proportions. It should be emphasised that the system of detecting the sick and the taking of blood smears from all suspected cases of malaria both European and native is much more thorough now than when the anti-malaria campaign was first started. The figures are instructive also in that they indicate a greatly reduced human parasitic reservoir with the result that apart from the endemic areas north of the Umfolosi river the insect vector has a much smaller chance of becoming infected. This is supported by dissections carried out by the Malaria Research Station at Eshowe during the past season. The infectivity rate in adult vectors taken from huts in formerly intensely malarious areas, now under systematic weekly insecticidal spraying, has been under 0·5 per cent.

Active control measures have been carried out by some 34 local authorities, 19 malaria committees and 14 voluntary committees throughout the Province employing a total staff of 73 Europeans, 12 Indians and 75 natives trained in control measures. In addition approximately 450 native and Indian sprayers have been employed by individual planters and sugar estates. The control measures adopted have been similar to those successfully employed last season. Local authorities rely chiefly on anti-larval control and only introduce anti-adult measures when fever occurs. Malaria committees and voluntary committees employ both anti-larval and anti-adult measures and in the case of the Umfolosi area where both *A. gambiae* and *A. funestus* vectors are present, the latter method is relied on entirely.

It is pleasing to report that malaria committees are now being guided more by their respective inspectors' findings, and are increasing or decreasing the intervals between application of oil or insecticide, in accordance with the breeding up of the vectors. This cannot fail to have a marked bearing on the expense involved and should bring the cost of control down to the most economic level consistent with efficiency. The past season has emphasised the benefits of this procedure, as in some areas it was necessary to increase anti-adult measures to a thrice weekly spray, while in others little or no oil or insecticide was required to be used. This is largely due to the nature of the chief crop, namely, sugar cane, which as a general rule, is cut at two yearly intervals. Thus in one year land may be heavily vegetated and innocuous, and the following summer the same land may be bare and provide numerous foci of prolific *A. gambiae* breeding.

In the *northern districts of Natal*, particularly Ngotshe and Paulpietersburg, the incidence of malaria has been greater than during the past three years. All low-lying farms were visited at the beginning of the season and farmers were advised of the necessary precautions to take. With the exception of two small groups no voluntary co-operation for control could be obtained, and few individuals paid any attention to advice offered. When malaria cases began to occur, however, there was a sudden awakening to the danger, numerous requests for a repetition of advice were received, and by the end of the season the majority were in possession of insecticide and spray pumps, and were carrying out anti-adult measures.



In the *Native Reserves* the Department exercises direct control. Owing to the cattle-keeping habits of the native population and the fact that *A. gambiae* breed most prolifically in small puddles such as cattle hoof prints, anti-larval control is impracticable and has only been attempted in small sections where the breeding foci are of limited extent and are liable to affect neighbouring Europeans. Anti-adult mosquito control by a weekly insecticidal spraying of all huts in infested areas is now the general practice. Systematic insecticidal spraying of huts besides diminishing the numbers of adult mosquitoes found in huts plays a very definite part in preventing parasite infection of vectors. The success which has been achieved by weekly spraying, is due to the house-frequenting habits of the vectors with which we have to deal. *A. gambiae* and *A. funestus* on hatching out make for habitations where they feed and rest until eggs are fully developed, a period of some days; they leave only to oviposit and return to seek shelter in the same or other adjacent dwelling. Thus the spraying weekly of all huts affords little chance for the adult mosquito to survive the twelve days necessary for it to become infected after having ingested the parasite from a human carrier. The more frequently spraying is carried out the less chance the vectors have to become infected, but the economic factor has also to be considered. Efficient weekly spraying has prevented epidemic malaria, in every case where it has been instituted. Twice weekly spraying has practically eliminated fresh infection.

During the past season systematic weekly spraying of some 16,000 huts representing a population of some 50,000 natives in reserves in this Province, has been undertaken, all sections under this method of control have been heavily infested with *A. gambiae* while in one section both *A. gambiae* and *A. funestus* were present. The work has been carried out by natives under the supervision of European inspectors. The staff employed numbering 8 European inspectors, 45 native malaria assistants and 50 native sprayers. The amount of material used was 6,000 gallons of insecticide, as against 2,500 gallons of anti-larval oil. This gives a fair idea of the extent to which anti-adult control has superseded anti-larval control in our native areas.

Since the inception of control only sporadic cases of malaria have occurred, notwithstanding the fact that all sections have been intensely malarious in the past. In the hitherto uncontrolled district of Nongoma where conditions in March approximated those preceding the epidemic of 1932, infestation became intense and the position appeared serious. Control by a weekly hut spraying was instituted in all affected sections embodying some 2,000 huts sparsely scattered over difficult terrain. No difficulty was experienced in introducing anti-adult control and complete control of the position was established within a month. The following letter which was received from the magistrate of the district concerned, expresses the appreciation of the Department's campaign in that district:—

“ Now that the malaria season is practically over I should like to express my appreciation—and I feel sure the appreciation of the natives also—for all that has been done by your Department during the current year in the campaign against malarial fever. In my opinion there would have been heavy mortality in this district but for the prompt action taken by the Health Department. We had a very long and severe drought, followed by a widespread outbreak of fever. The natives' powers of resistance had been lowered because of shortage of food. The liberal supply of quinine, the spraying of huts and the ready advice given by employees of the Department saved the situation. The natives are thoroughly convinced of the efficacy of quinine, and have also come to realise that the mosquito is the cause of the fever. Their education in health matters has advanced considerably. We are very thankful for what has been done.”

The Native Affairs Department has co-operated with the Health Department and has made possible the institution of permanent measures for malaria control in native areas by the allocation of funds for the planting of trees (*Eucalyptus saligna*) in swampy or water-logged sections of the reserves. In the course of the past year some 130 acres have been ploughed and planted, 75 in Lower Tugela, 35 in Eshowe and 20 in the Mtunzini district. A continuation of this policy on a more liberal scale will in time have far reaching effects by not only eliminating seepages and water-logged sections and so abolishing breeding areas for *A. gambiae*, but also by profitably utilising land which is now of little value either to the natives or the Government.

Throughout the season the closest co-operation has been maintained between the South African Institute for Medical Research Station at Eshowe and the Department. The Department's field staff has forwarded material, mainly live adults for dissection from various sections of the coast at weekly intervals. The information so gained has in many cases been used as a guide in starting up control schemes. An experiment subscribed to by officers of both Departments to obtain data as to the efficacy of anti-adult control was carried out in a hyper-endemic section affected by both *A. funestus* and *A. gambiae* over a period of four months. The results which



should be of interest to all concerned will be published in due course by the Research Officer.

The testing of various commercial insecticides submitted has been undertaken by the Research Station on behalf of the Department and this has been of great value in assessing the comparative efficacy of the various preparations now on the market.

With an organisation for malaria control such as exists to-day comprising numerous separate entities and covering an area of roughly 27,000 square miles, the co-ordination of the various bodies and the dissemination of information are of the utmost importance. To ensure this all active organisations are regularly visited and posted with lists indicating where vectors are being found, and weekly bulletins are published stressing the essential factors necessary to maintain effective control of the disease. The inspections carried out by the Malaria Inspectors in Natal during the year, may be summarized as follows:—

<i>Local Authorities.</i>	<i>Malaria Committees.</i>	<i>Voluntary Committees.</i>	<i>Farms and Estates.</i>	<i>Native Reserves.</i>	<i>Grand Total.</i>
156	158	133	801	846	2,094

The state of affairs in the several Provinces is set out in a weekly bulletin issued publicly from Head Office in Pretoria. In Natal, in addition, a fortnightly bulletin stating all new findings of *A. gambiae* and *funestus* is issued privately to local authorities, and other interests to keep them thoroughly *au fait* with the mosquito position. The subject matter of the former bulletin which is published in the Press was adversely criticised by interested parties in the South Coast and the accusation was made that the position on the South Coast is put on a parallel with the North Coast which is termed "notorious". The complainants held that fever on the South Coast was confined to a certain native area under the control of the Health Department and affected no other place. None of these statements is true. The coast belt from Durban North to the Tugela compared favourably with the South Coast which itself showed a very light sprinkling of cases in and without township areas from Port Shepstone, northwards, and Durban. Malaria vectors were similarly distributed. The native area complained of on the South Coast was heavily infested. This area which is a native Trust and not under the control of a local authority or administered like an ordinary native reserve was handled by the Health Department by meticulous spraying and some 6 cases only of fever occurred. The position there is admittedly unsatisfactory. Permanent measures have been urged for three years, but have not yet been given effect to and there is no question but that until such is done there is a menace. To make out, however, that malaria was confined to that particular native area and that the Health Department is solely responsible for it, is unwarranted. The bulletins have been meticulously correct, and if they have not specified the exact townships in which cases occurred it was because the circumstances were such that there was little or no risk in view of the precautions being taken by the said townships.

B. *Tzaneen Field Station.*—During the year the staff attached to this station consisted of—

- (a) a medical inspector (Malaria);
- (b) four health inspectors, one of whom operated from Barberton and another from Lydenburg;
- (c) four lady health visitors stationed at Alldays, Mokeetsi, Swartwater and Zoetdoorns respectively;
- (d) a technical assistant in the laboratory at Tzaneen; and
- (e) four native spotters.

In most of the Bushveld regions such as Rustenburg, Waterberg and part of the Zoutpansberg, malaria has had the usual seasonal incidence. At Zoetdoorns, Bochem and Bandolierskop widespread epidemics occurred during March and April. At Zoetdoorns the population, in spite of warnings issued by the station inspectors and in the local Press, was caught unawares by the outbreak. This particular outbreak is interesting as the 1936 meteorological conditions differed little from former years, but nevertheless, owing to the occurrence of some unknown factor or factors the year saw the prolific breeding of *A. gambiae*. This breeding was followed by an epidemic which caused unusual hardship owing, largely, to its impact on a population weakened by poverty and malnutrition. Consequently it was necessary to institute special measures of poor relief and to provide supplies of foodstuffs. In some areas of the Zoutpansberg similar arrangements for the distribution of rations had also to be made.



That the utility of blood smear examinations is gaining recognition is indicated by the figures given in the following table of examinations carried out at the laboratory in Tzaneen:—

Period of Time.	No. of Blood Smears.	Positives.	Negatives.	Relapse Cases.	Repeat Smears i.e. while under Treatment.
1st April, 1932 to 30th Sept., 1932	55	22	33	3	Nil
1st Oct., 1932 to 30th June, 1933	965	397	497	34	71
1st July, 1933 to 30th June, 1934	1,092	373	620	79	99
1st July, 1934 to 30th June, 1935	837	263	540	34	37
1st July, 1935 to 30th June, 1936	1,151	567	584	39	25

Blood-smears made during the last season indicated once again that the most prevalent type was *subtertian* and that though *benign tertian* was frequently seen the *quartan* continued to be rare.

A beginning was made during the season of investigating the infectivity rate amongst anopheline vectors in various parts of the Transvaal. In the Pongola Settlement area this rate was shown to fluctuate between 4 per cent. and 6 per cent. During this examination an interesting fact concerning difference in size in the species of *A. gambiae* was observed. This was the only distinction as in every other respect including the rate of infectivity the varieties were similar.

Further work has definitely established that there are several species of *A. funestus*. Two of these have already been described, namely *A. funestus* var. *rivulorum* and *A. funestus* var. *confusus*.

The fact that *A. gambiae* propagated in numerous numbers in the Zoetdoorns district has been noted above, and the determination of the factors governing such propagation is one of the research items now receiving attention.

As in previous years the Medical Inspector and the health inspectors have undertaken extensive travelling throughout the malarial districts. This work was designed to keep the vector mosquitoes under observation and to inspect and to educate local communities in malaria prevention. The four lady health visitors are being increasingly used in developing rural health centres in their respective districts. These officers use every occasion for instructing local populations, not only in malaria prevention, but also in general health matters. Every possible opportunity of instructing school classes and "nagnaal" gatherings is taken as being especially useful. At some of these centres it has been possible to place girls trained in midwifery drawn from the local population and subsidised by this Department.

Field observations have again demonstrated the importance of adequate and suitable housing in malarial control and prevention. In furthering programmes to provide better conditions the Station has co-operated in the housing schemes being developed by the Department of Labour and Social Welfare for the poorer farmers and labourers.

A further most important extension of the field work initiated, has been a system of surveys of the more important native locations to determine local environmental factors governing malarial intensity.

It has been possible to utilise the field staff in routine sanitary and health inspections of towns and villages in the malaria area during the off-season. Such inspections enable valuable advice to be given for the improvement of local sanitary conditions.

In addition to the *propaganda work* undertaken by the lady health visitors and the health inspectors, the Medical Inspector has again throughout the area addressed public meetings and interviewed the managements of industrial and agricultural organisations in regard to malarial prevention and control. Valuable assistance in this field as in other directions has again been rendered by the local medical practitioners and district surgeons.



The arrangement, commenced some years ago of training teachers in the prevention and care of malaria, has been continued. The class is held annually at Tzaneen in January, and is made possible financially by the Provincial Department of Education. In conjunction with the class of this year malarial films were shown. This film method of propaganda is being exploited, and to this end a portable cinema projector has recently been obtained, which it is proposed to use in rural areas with the aid of a light power unit.

It is now four years since the Station commenced the testing of Atebrin. This has revealed that while Atebrin has a lethal effect on both the sexual and asexual cycles of *benign tertian* it has none on the sexual forms of *subtertian* malaria. Largely on the basis of this evidence the Station has advocated a treatment supplementing Atebrin with Plasmoquin. This treatment, consisting of three tablets of Atebrin daily for seven days followed by two tablets of Plasmoquin, .01 gms. each, on alternate days until 10 to 12 tablets have been taken, has become popular and has yielded good results. Recently a combination pill containing these two drugs has been used with success.

Reviewing the work of the Station during the last year it is felt that there is just cause for optimism in the eventual success of the methods being advocated. The inhabitants of the Northern Transvaal areas, who for years suffered from malaria, are gradually appreciating the fact that malaria is a preventable disease, and that, in their own interests, as well as those of the community at large, it is necessary to use sound measures of prevention and cure.

C. *Eastern Transvaal*.—The first general rains in this area did not occur until the second week of January, after which no further heavy falls were recorded until March. The Medical Inspector (Malaria) of the Tzaneen Field Station, who is in charge of malarial work in the Eastern Transvaal, reports that following these latter rains, cases of malaria appeared in the Lowveld, and were especially numerous in the Steelpoort Valley, the Crocodile River Valley, and the basins of the Komati, Lomati, Sabie and Umbobab Rivers. The *mines* in the Eastern Transvaal, being largely outside the malarial zone proper, did not suffer to any extent. A similar freedom was enjoyed by the large *citrus estates*, chiefly being due to the anti-malarial measures undertaken by them.

In regard to farms in this area, the situation varied considerably. Progressive farmers, who carried out such measures as methodical hut-spraying, both in their native labourers' quarters and in their own dwellings, escaped serious results. Others, however, who have not yet adopted such precautions as house-screening, segregation of native labourers and anti-adult mosquito work suffered heavily.

Inspection work by the medical inspector and his staff included visits to all Police posts in this area, the Irrigation and Customs stations at Komatipoort, the Prison, Barberton, and the Nelspruit Research Station. Lectures and film demonstrations were also given at the important centres.

A few infections have again been reported as occurring amongst visitors to the Kruger National Park. A heavy responsibility rests on the Board of Management to take all possible measures for the protection of visitors from malaria. This, I am glad to state, is becoming increasingly realised by the Board and staff of the Park.

D. *Railway Areas*.—A detailed account of the anti-malarial measures carried out during the year will be found in the annual report of the South African Railways and Harbours Organisation which is published as Annexure D to this report.

6. *Plague*.—The rodent inspectors of the Department continued to find evidence of the extensive epizootic noted in the previous annual report. This epizootic was eventually shown to have spread throughout the area inhabited by the gerbille, extending west far into the Kalahari Desert and reaching north beyond and including the Witwatersrand region. The adjacent territories of the Bechuanaland Protectorate and Basutoland also notified the existence of extensive and decimating waves of rodent mortality.

The discovery by officers of the Department of evidence of an epizootic having recently swept over the Reef area was disturbing and led to the issue of a notice in the weekly bulletin of 21st December, 1935, and a warning to the local authorities concerned.

The existence of the Witwatersrand Plague Committee enabled useful action to follow these warning notices. This Committee was established early in 1935 as a voluntary co-operative body of senior health officials of the Reef municipalities and representatives of the Union Public Health Department, South African Railways and Harbours, and the Gold Mining Industry. Its objects were to exchange information and to develop a



programme on uniform lines in all areas "to deal with the destruction, elimination and the prevention of ingress of rodents".

Following the reports mentioned above the Committee decided on more vigorous action. The co-operation of this Department led to an assistant health officer and a senior rodent inspector being detailed to carry out an inspection of the Reef area, to make recommendations as to the necessary measures to be undertaken and to assist in the training of rodent staffs.

The first report has already been received and surveys the section of the Johannesburg municipal boundary lying to the south of the main line, viz.: from Zuurbekom in the west, along the Klip River Valley to Jackson's Drift, and from there eastwards to Rondebult, some ten miles south of Johannesburg on the Heidelberg road.

The observations made during the inspection of these outside areas may be summarised as follows:—

- (1) *Veld Rodents*.—Investigation of areas outside the range of the municipal gangs shows that gerbilles and other species are actually recovering from the effects of the last epizootic. The formation of fresh gerbille colonies was noted over the whole of the country traversed. Most of the native huts in rural areas are infested with house mice or multimammate mice, but there is evidence of a considerable reduction in the numbers of these rodents during the last six or eight months. In the Race-course township at Klipriviersoog only house mice are met with. No evidence of the presence of multimammates in better class dwellings or on rat-infested premises were met with anywhere. In several instances, however, the displacement of multimammate mice in native huts by rats was observed.
- (2) *Domestic Rats* (*Rattus rattus species*).—Rats have become dispersed widely over the countryside. Evidence of their presence is to be met with wherever conditions of harbourage and food supply are favourable, e.g. in dairies, outbuildings on farms, shops, slaughterpoles, etc. But there has been a remarkable reduction in numbers everywhere during recent months. Premises which are known to have still been overrun by them towards the end of February last are practically free from them at present, although the harbourage and food supply remain the same. In only one instance, however, was the presence of dead carcasses noted by the owner of the premises.

Evidence was obtained that apart from other means of transport, dispersion also takes place by migration from permanent harbourages. Further, there would appear to be a seasonal migration from infested premises, especially at the time of ripening of various crops. This is particularly the case in native habitations to which rats are attracted temporarily during the harvesting season. The municipal gang working in the northern section of the Johannesburg area has recently found a dozen or more instances of rats (*Alexandrinus*) living and breeding in isolated burrows in market gardens on Melrose and London farms at Cyano Works and on Savoy Estate. On investigation it was quite evident that these are temporarily seasonal excursions from permanent harbourages in quest of a change of food. In most of these instances the rodents were attracted from their normal habitat by the ripening of the pumpkin crops; they were occupying holes made by themselves, not gerbille burrows.

A good idea of rat infestation of mines was obtained during an inspection of one of the larger mines in this area, covering an area of about 12 to 15 square miles. The inspection, which has just been concluded, lasted more than a week, but was well worth the time devoted to it.

In the modern compound, which is practically ratproof, rats will find it difficult to obtain a foothold. On the other hand, it was found in one such compound where there is very little harbourage that the rats were living mainly among stones and collections of scrap metal outside and entered the natives' rooms at night. In the two oldest compounds they were found to be breeding in boxed-in spaces at the gables, etc. In each of these compounds, a native is employed constantly in cage-trapping. In one of these with twelve traps, the average weekly catch has been from 70 to 80. Elimination of harbourages in these latter compounds has been commenced. The opportunity was taken on this mine of giving a demonstration of gassing, and about 50 rats, consisting mostly of females, most of them pregnant and some with young, were killed.

Harbourage in dumps would appear to be determined by proximity to food supplies and the prospect of freedom from disturbance while breeding. It was learned that rats seldom harbour in dumps on to which stone is being discharged. It would also appear that in the producing mines, there is very little movement or transportation of rats from the surface into the



mine, and practically none from the mine to the surface. The extent to which use of old disused shafts is being made by them has still to be investigated. Specimens of rats collected from underground a few years ago all belonged to the species *Rattus rattus rattus*, but among those captured during the recent visit there were several of the white-bellied (*frugivorous*) race.

Very few fleas have been found on rodents captured on the surface. On the other hand, nests of gerbils and water-rats have, in several instances, been found to be teeming with them, as many as 170 being recovered from one nest. They also appear to be slightly more numerous on rats underground than on those on the surface.

Each municipality represented on the Witwatersrand Plague Committee is intensifying its campaign, and following the advice of the Department, rodent proofing of buildings and the elimination of harbourages are now chiefly stressed as the best line of defence against plague.

A further important work being speeded up at present by the Department is the improvement of conditions at the ports. A senior rodent inspector is now undertaking a survey of these and has recently reported upon the harbours at Durban and Port Elizabeth. His recommendations are being given effect to with the utmost dispatch.

The Railway health officials are continuing their efforts in protecting the big centres from rodent invasion by rail, in eliminating rodents in railway areas and ports, and in assisting locally in any outbreak of human plague. This co-operation with the Department of Public Health has been a very useful and efficient feature of the plague outbreaks of the last season. Details of the rodent plague work undertaken by the Railway Administration are given in an annexure to this report.

Though the transport of rodents by railways is receiving increasingly efficient attention, the importance of motor transport in this respect is not yet fully realised. A recent example will demonstrate this. Of a sample of 31 motor-cars seen in one of the large ports during the holiday season, 28 had come from plague-infected areas in the Free State and the Transvaal. Three of these cars were examined and definite indications were found that at one time, and that quite recently, rodents had obtained harbourage under the back seats. This experience but confirmed many previous observations that rodents find peculiarly suitable conditions for nesting and transport in motor-vehicles, resulting in a menace which is difficult to control and rendering rodent-free belts of no great security. Farmers and storekeepers particularly have a duty to keep cars and lorries free from rodents.

The human cases and deaths of plague which occurred during the year are summarised in two tables. Table I (i) gives these cases and deaths by Provinces and by race, while Table I (ii) indicates the geographical distribution by district. The total number of cases and deaths was less than the previous year, being 253 cases with 165 deaths as against 290 cases with 184 deaths revealed in the previous annual table. However, the seasonal distribution and the increased number of pneumonic plague cases were of more serious import. In a recent publication Dr. Fourie mentioned that the seasonal incidence of plague in recent years is tending to become somewhat irregular, cases occurring with greater frequency during the winter months. This statement is confirmed by recent experience, as cases continued to occur through the autumn and winter months, with May and June returning figures of 16 and 20 cases respectively. Some reference to an outbreak occurring in June at Lindley will be given later in this section.

From Table I (i) it will be seen that though the absolute number of cases was less than the previous year, the number of outbreaks was greater, covering 34 districts as against the previous 28.

Table I (ii) reveals that the Orange Free State again suffered the most, but the Cape Province this year had human plague outbreaks in eight districts, as compared with only four districts last year. In the Transvaal only three districts reported human plague, these being Klerksdorp, Lichtenburg, and Ventersdorp in the south-west.

The Department maintained the usual machinery to deal with the situation. Three full-time rodent inspectors operated continuously in the field, investigating outbreaks and directing preventive measures. Further, during the height of the plague season, a medical officer was detailed for special duty and travelled extensively, dealing with various outbreaks.

Experience gained during the season again demonstrated that the officers of the Department, assisted on occasions by part-time de-verminisers and by the co-operation of Railway health officers, were promptly on the scene and instituted necessary measures to control spread in an efficient manner. However, various instances have led to the conclusion that much of the work of the Department's officials is not properly appreciated. The



guiding principle of health work in this country is that the central organisation exists to supervise, assist and co-ordinate local effort. It is desired to foster local initiative, enthusiasm and control, not to replace it, but unfortunately too often, especially in rural districts and smaller towns, an attitude of shifting responsibility to the Government persists. This is carried to extraordinary lengths on occasions, as the Department's officials whose function it is to advise and co-ordinate have been expected to undertake even the most trivial duties, such as personally filling up rat-holes and deverminising servants' clothing. One individual claimed that it was the duty of the Government to remove the fleas from his servants!

For several years lectures and demonstrations have been directed to establishing in most of the plague areas skeleton organisations and developing a knowledge amongst district surgeons, farmers, and others of how to prevent and deal with outbreaks of plague. Yet in the last season many of the outbreaks occurred in areas previously the object of intensive propaganda, and the scene of previous outbreaks, but local authorities and inhabitants often preferred to do nothing until an official from the Department had arrived. This frequently means the loss of valuable time, and an increased difficulty in tracing contacts and deverminising the area. The absence of representative local government in the Transvaal and the Free State rural areas is largely contributory to this lack of interest and sense of duty in such health problems. In the Cape, where the divisional council system is concerned with rural health, though an initial outbreak of an infectious disease may not be so efficiently undertaken as when directly organised by the Department of Public Health, yet on further outbreaks developing, the previous experience enables the local divisional council usually to institute rapid control measures. This was exemplified, for instance, in the Kuruman district. Plague experience suggests that some form of local rural health government in the Transvaal and Free State would be a progressive step in the improvement of rural health conditions. Such important matters as the housing and care of farm labourers, the storage of farm products, and the rodent-proofing of farm buildings, factors intimately connected with plague prevention, would receive readier attention than they do at present. A sense of individual responsibility and duty to the community would, eventually, be secured under such circumstances, to replace the all too frequent supine belief and expectation that the Government must do everything.

Four of the more serious outbreaks deserve some reference.

The first of these occurred in the Kuruman district.

In a native reserve to the south-west of the town of Kuruman, commencing late in December, 1935, fourteen cases of pneumonic plague with fourteen deaths, occurred. Direct contact was discovered in all, resulting largely from friends and relatives attending funerals and on these occasions visiting the remaining sick. The cases were spread over a large portion of the reserve, but the outbreak finally ceased about the middle of January following quarantining and deverminisation of huts and contacts.

The habitations, chiefly of wattle and daub construction, being situated in small family groups widely separated were fortunately not conducive to intimate interfamilial contacts except on the occasions of funerals. The first case was a right-axillary bubonic infection with terminal pneumonia, this lighting the train of pneumonic infection. The rodent source was undoubtedly multimammate mice, shown to be infesting the huts.

The second outbreak of interest was one which occurred in a compound of a small mine property on the Vaal River west of Vredefort. The compound is situated on the side of a rocky koppie, and examination of the area showed that the gerbille burrows in the sandy "vleis" and the nests of the African rat (*Aethomys*) in the koppies were deserted. The chain of rodent infection seemed to be therefore from the gerbille, through the African Rat, to the domestic rat in the compound huts. The mine officials had noted dead rodents on the property late in January, and with commendable promptness, had sent one specimen for examination with, however, a negative result, and had undertaken deverminisation of their stores. However, commencing on 23rd January, and continuing to the end of February, a series of cases developed, six of whom came from a single compound hut. The first cases were seen by the district surgeon, who also undertook *post-mortem* examinations and sent laboratory specimens away, but neither examination definitely suggested plague, though this disease was suspected. Plague was eventually proved from a bubonic fluid specimen in a further case, and thus it was concluded that the whole outbreak was to be ascribed to this disease, which resulted in nineteen cases and eight deaths. Eleven cases exhibited definite buboes, but seven of the fatal cases gave a clinical picture of a fulminating generalised toxicaemia justifying a diagnosis of the septicaemic form.

A third outbreak deserving mention is one which was discovered on a farm inhabited by a group of related Zulu families in the Lichtenburg district. In many respects this constituted the most serious set of circumstances



with which the Department was confronted during the year. The first case took ill on 24th February and was followed by a further five cases in the same family group, including a case which was submitted to *post-mortem* examination by the acting district surgeon. The first five cases were diagnosed as pneumonia, a diagnosis justifiable to some extent on clinical grounds, but which in some respects should not have been considered final, as all cases were of a fulminating type and their family relationship was suggestive of a highly infectious origin. On his return to duty the district surgeon saw the sixth case, and suspecting plague, did a *post-mortem* examination, the specimens obtained demonstrating plague infection.

When the medical officer and the rodent officer deputed by the Department to investigate the report arrived on the same day, 21st March, they were confronted with a situation with some perturbing features. Six fatal cases of pneumonic plague had occurred on a farm inhabited by approximately some 150 to 200 persons and immediately adjacent to a large native town of over 2,000 inhabitants. The various funerals had been attended by many hundreds of mourners, including ten individuals who had come and returned to various Reef municipalities by car. Primary contacts therefore probably numbered scores and were distributed widely by the time the outbreak had been reported. Therefore it was not surprising that in the course of the next twelve days further cases were discovered. Finally the outbreak had accounted for fourteen fatal cases, eight pneumonic and six bubonic, on three farms covering an area of many square miles.

The practical importance of this particular outbreak lay in the demonstration it gave of the importance of the motor-car in distributing contacts. Several relatives and friends summoned by telegraph to attend the funerals had made the return journey from several Reef municipalities by car, a total distance of over 300 miles, within 24 hours. Fortunately the natives concerned were relatively intelligent and offered co-operation in all respects, enabling these Reef contacts to be traced and kept under surveillance.

The final outbreak to be quoted is given as a further illustration of the danger likely to arise from the custom of relatives travelling many miles to attend funerals and minister to the sick. In June of this year a serious outbreak of pneumonic plague occurred in Lindley which was proved to have had its origin in plague cases on a farm near Petrus Steyn. One of these cases had been attended by a native minister from a farm near Lindley, and who on his return home himself took ill. At the onset of his illness his relatives moved the minister into the Lindley Location where he was instrumental in spreading pneumonic plague to his contacts. Prompt action by the local authority, under the supervision of one of the Department's officers, fortunately resulted in the prevention of further spread.

The problem of plague in Southern and Central Africa received the serious attention of the *Pan African Health Conference* held in Johannesburg in November. Sir Edward Thornton presented a paper setting out the position in the Union. Dr. L. Ribeiro reported on the developments in endemic plague in Angola since 1932. Lieutenant-Colonel G. Girard gave an account of plague in Madagascar and the new knowledge gained from research during the past three years; the position there differs from that in South Africa in that there are no indications to suggest that wild rodents play any part in the preservation of the virus or its transmission to the domestic rat (*Rattus alexandrinus*) which, together with the house mouse, is the only domestic rodent. Other delegates made verbal statements as to the position in their countries.

From the discussion it emerged that much of the extension of the veld epizootic presaged at the previous Conference had already taken place. Its spread among wild rodents appears inevitable, but in certain countries it can be checked and controlled. In the Union of South Africa and countries grouped immediately to the north and west of it, the incidence of human plague is determined by the epizootic among wild rodents, infection being in great part direct from wild rodents, and to a less extent from domestic rats infected by fleas from wild rodents.

In the more northern territories, such as Kenya, Uganda and Tanganyika, an increased importance of the domestic rat is evident. There is a strong possibility, and in some cases a certainty, that wild rodents are responsible for the infection of domestic rats.

The fact that, in several countries, an epizootic has occurred among wild rodents for considerable periods prior to its discovery points to the absolute necessity for systematic observation, and also for co-ordination between adjoining countries, so that each will know the precise conditions existing in its neighbour's territory. Concerted action along frontiers is very desirable.

There are marked differences in grouping of cases and also in case-mortality rates between plague occurring under open country conditions and conveyed by veld rodents, and plague occurring under town conditions, and



even in rural areas, where the immediate rodent host is the domestic rat. It was agreed that this was a matter which required investigation.

There is a likelihood that the strains of *B. pestis* in a veld epizootic become attenuated and eventually lead to a cessation of the primary wave of the epizootic; but the whole question of the mechanism of these veld epizootics, the factors which keep them going, and the part, if any, played by domestic rodents in providing foci, requires further investigation.

Though the biology of the veld rodent has been fairly well worked out in some areas, it certainly has not in all. A very extensive and co-ordinated investigation by trained biologists into this question was urged. Similarly it was agreed that a study of flea vectors, their relation to rodent hosts and the behaviour of *B. pestis* in them, specially as regards virulence, was equally desirable. Such study should be centralised and co-ordinated.

Detailed methods of plague control cannot be standardised and must be adapted to local circumstances. There was no conflict of opinion in regard to the prime requirement of towns—namely, the direct attack on domestic rodents; but circumstances must determine whether the attack in rural areas should be primarily against all rodents, domestic and wild, or whether it should feature to some extent prophylactic vaccination of the human population. There was a divergence of opinion as to whether such prophylactic vaccination should employ living or dead cultures.

*Research Work* on serological aspects of plague has continued at the South African Institute for Medical Research, Johannesburg, where this work is under the charge of Dr. J. H. Harvey Pirie. A concentrated anti-plague serum prepared in the serum department of that institution by Dr. Grasset was tested on experimentally infected rats. These tests showed that the concentrated serum had fully maintained its protective qualities. For practical use the fully concentrated serum (pseudoglobulin fraction) is diluted so that its protective power is approximately three times that of the original serum, the protein content being 12 per cent., which is reasonably and sufficiently low even for intravenous administration. The Institute recommends the same dosage as was formerly advised for the unconcentrated serum, the acute nature of the infection seeming to justify this policy.

I think that there is a strong case for the appointment by the Government for three years of a specially trained scientist to check over all the data hitherto collected on plague amongst veld rodents in South Africa. His work should be mainly in the field and he should be closely associated with the various expert officers of the Department as well as those of the South African Institute for Medical Research. Such an officer, who need not be a medical man, would undoubtedly have to be imported. I have no doubt but that through the auspices of the Medical Research Council of Great Britain the services of a suitable officer could be secured if authorised.

TABLE I (i)—PLAGUE CASES AND DEATHS IN THE UNION DURING THE YEAR ENDED 30TH JUNE, 1936.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Coloured or Native.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape.....	8	4	3	34	27	38	30
Natal.....	—	—	—	—	—	—	—
Transvaal.....	3	—	—	23	19	23	19
Orange Free State.....	23	14	5	178	111	192	116
UNION.....	34	18	8	235	157	253	165

TABLE I (ii)—DISTRIBUTION OF HUMAN PLAGUE AMONG THE DISTRICTS OF THE THREE AFFECTED PROVINCES.

Province.	European.		Non-European.	
	Cases.	Deaths.	Cases.	Deaths.
<i>Orange Free State Province.</i>				
Bloemfontein.....	1	—	18	18
Boshof.....	—	—	3	—
Bothaville.....	1	—	3	3
Brandfort.....	—	—	2	—
Cloeolan.....	—	—	1	1
Dewetsdorp.....	—	—	4	3
Fauresmith.....	—	—	3	2
Heilbron.....	1	—	9	5
Hoopstad.....	3	1	14	10
Jacobsdal.....	1	—	—	—
Koffiefontein.....	—	—	11	1
Kroonstad.....	6	3	13	4
Lindley.....	—	—	14	13
Rouxville.....	—	—	1	1
Senekal.....	—	—	5	4
Smithfield.....	1	1	5	5
Thaba 'Nehu.....	—	—	7	2
Trompsburg.....	—	—	2	2
Ventersburg.....	—	—	15	9
Vredefort.....	—	—	21	9
Wepener.....	—	—	8	8
Winburg.....	—	—	17	9
Zastron.....	—	—	2	2
23 DISTRICTS.....	14	5	178	111
<i>Cape Province.</i>				
Calvinia.....	—	—	2	2
Glen Grey.....	—	—	1	1
Herbert.....	2	1	—	—
Hopetown.....	—	—	1	1
Kuruman.....	2	2	21	17
Queenstown.....	—	—	5	3
Uitenhage.....	—	—	3	2
Williston.....	—	—	1	1
8 DISTRICTS.....	4	3	34	27
<i>Transvaal Province.</i>				
Klerksdorp.....	—	—	1	1
Lichtenburg.....	—	—	14	14
Ventersdorp.....	—	—	8	4
3 DISTRICTS.....	—	—	23	19

7. *Psittacosis*.—Owing to the serious disease which is communicable to man from parrots and related birds South Africa, in common with most other countries, has to control very carefully their admission into the country. The whole question of control by national health administrations was recently considered by the Health Committee of the League of Nations, which after due inquiry, was not prepared to recommend that existing restrictions should be discontinued. The issue of permits in South Africa is at the discretion of the Secretary for Public Health (Proclamation No. 211 of 1931). During the first year or two after the Proclamation that discretion was rather more widely used than at present in favour of private bird fanciers who were allowed to import limited numbers of birds under safeguards. But it was found necessary as a result of dangerous abuse to tighten up the procedure followed. At present no private individuals are allowed to import any of the birds falling within the scope of the Proclamation from overseas with the exception of pets which have been in the family for long periods and could not therefore have been exposed to infection from wild birds. A few special permits have been issued to zoological gardens to import these birds under stringent safeguards.

The position is set out here somewhat fully because of the repeated requests that reach the Department for permits. Considerable resentment is not infrequently expressed when these requests are refused. Thus it has been urged that birds from Australia should be allowed in because psittacosis was unknown in that country. That the Department was right in its policy of refusing unrestricted admission of birds from Australia has been demonstrated by recent events. As the result of careful research by workers in Australia during 1935, it was found that the disease was enzootic amongst several of the common species of Australian parrots in the wild state. The virus strains derived from these birds resembled closely those isolated from human and parrot infections in Europe and America. In the April-May, 1935, Session of the Office International d'Hygiene Publique it was reported



that though no human outbreak of psittacosis had up to the date of the discovery of the disease among birds been officially reported in Australia, it was thought probable that such cases were indeed occurring, mistakenly diagnosed as pneumonia secondary to some other ailment. Medical practitioners and veterinarians were thereafter asked to be on the alert for sickness in man or birds which might throw light on the position. As a result definite cases have now come to light in Victoria. Thus eight human cases were traced to one consignment of wild birds delivered by a trapper to a bird dealer in a suburb of Melbourne. Full descriptions of several of these human cases are published in the Medical Journal of Australia, 14th March, 1936.

8. *Rabies or Hydrophobia*.—Five persons were reported as having died of rabies during the year. In each case the circumstances surrounding the occurrence were carefully investigated. Four of the deceased were Europeans, including one female, the fifth being a native female. Two of the patients had previously been bitten by mongoose, one by a domestic cat, and one by a dog. The fifth had been injured by dealing with an ox which was presumably rabid.

It cannot be too frequently stressed that sick carnivorous animals, particularly the yellow mongoose, must be looked upon as highly dangerous. Children in the veld are often tempted to chase after the small animals when they obviously are unable to run rapidly.

This department, jointly, with the Director of Veterinary Services, has prepared a detailed pamphlet on rabies. In this pamphlet full information is given of the occurrence of the disease with descriptions and pictures of the wild animals known to be carriers of infection, mode of transmission, symptoms, diagnosis, the procedure for collection of material for laboratory tests, preventive measures and treatment. It is intended primarily for the information of magistrates, district surgeons, veterinary officers and local authorities. It should prove valuable also to teachers and others in authority who are in a position to warn persons of the danger of infection and the precautionary measures which should be adopted.

9. *Smallpox*.—This disease occurs in the Union mostly in a very mild form. Many of these mild cases which, among the Bantu are known as Amaas, are not reported and, therefore, are not recorded. The cases of smallpox actually diagnosed as such during the year are shown in Table J.

TABLE J.—SMALLPOX: CASES AND DEATHS REPORTED DURING THE YEAR ENDED 30TH JUNE, 1936.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Non-European.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape.....	1	—	—	1	—	1	—
Natal.....	2	—	—	4	—	4	—
Orange Free State.....	2	—	—	4	—	4	—
Transvaal.....	4	—	—	15	6	15	6
UNION.....	9	—	—	24	6	24	6

No cases occurred among Europeans. Of the 24 cases reported as occurring among natives, 15 occurred in the Transvaal, of which, 6 proved fatal, an unusually high proportion.

Legislation in regard to vaccination is actively enforced. Tables summarizing this work will be found in Annexure E at the end of this report.

10. *Tuberculosis*.—In the last annual report mention was made of the urgency of the tuberculosis problem.

The extent to which tubercle infection occurs in the Union is not accurately known. Notifications of the disease remain somewhat defective and their number gives an erroneous idea as to the prevalence. The cases notified during the year are set out in Table K (i) and are seen to total 8,755. This figure shows a slight decrease as compared with the number notified last year, 8,896. The difference in these figures is so small that it conveys no information of any practical value, though the improved economic conditions resulting in more suitable diets and improved housing conditions amongst the poorest classes of the community have, no doubt, played a part in producing fewer cases of the disease.

TABLE K (i).—TUBERCULOSIS: NOTIFICATIONS DURING THE YEAR ENDED 30TH JUNE, 1936.

Province.	European.	Non-European.	Total.
Cape (excluding Transkei).....	511	4,279	4,790
Transkei.....	1	955	956
Transvaal.....	109	1,273	1,382
Natal.....	143	1,270	1,413
Orange Free State.....	28	186	214
UNION.....	792	7,963	8,755

The death rates from tuberculosis for Europeans in the Union is shown in Table K (ii). For 1934 it was 39·54 per 100,000 which is a small but definite drop as compared with previous years. In 1935 it was 41·05. Our drop in tuberculosis mortality compares very badly with that for England and Wales. In those countries, the institution of suitable measures by the Government has reduced their death-rate by one-half during the past twenty years. In the Union, over the same period, it has only dropped from 51 in 1913 to 41 in 1935. Our figures apply only to Europeans. It is probable that if Bantu statistics could be included, little, if any, drop in mortality would be revealed. Owing to the almost complete absence of vital statistics regarding our native population, the death rate among them is impossible of assessment. This difficulty arises again and again in public health administration in the Union, and strikingly illustrates the necessity of securing a proper system of vital statistics among non-Europeans.



TABLE K (ii).—DEATH RATES FROM TUBERCULOSIS PER 100,000 OF POPULATION—EUROPEANS ONLY.

Year.	CAPE.			NATAL.			TRANSVAAL.			ORANGE FREE STATE.			UNION.		
	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.	M.	F.	P.
1912.....	70.55	44.83	58.11	85.84	62.66	75.03	55.97	26.97	43.14	29.58	28.09	28.89	61.10	38.32	50.49
1913.....	70.19	53.93	62.31	81.15	52.19	67.60	57.61	22.43	41.88	29.54	24.13	27.02	61.21	39.67	51.13
1914.....	60.82	40.27	50.85	83.59	32.85	59.80	57.60	25.42	43.08	28.44	14.31	21.81	57.26	31.39	45.10
1915.....	56.42	40.43	48.64	69.37	33.52	52.52	60.69	21.73	42.95	19.98	25.92	22.78	54.26	31.76	43.63
1916.....	42.31	44.91	43.58	75.22	35.95	56.72	72.37	33.91	54.71	27.30	16.30	21.99	53.91	36.77	45.78
1917.....	64.12	51.27	57.53	66.75	38.21	53.28	70.23	22.42	48.09	37.75	16.12	27.44	63.18	35.55	50.02
1918.....	52.07	39.25	45.81	64.87	46.97	56.39	76.62	21.28	50.80	37.65	18.20	28.33	60.24	31.06	46.28
1919.....	41.56	49.23	45.32	57.63	30.66	44.73	82.21	13.39	49.82	43.60	12.37	28.61	57.95	30.55	44.77
1920.....	52.55	39.07	45.94	73.70	43.50	59.14	72.91	19.73	47.70	45.30	17.79	32.08	60.92	30.07	46.00
1921.....	36.99	64.06	60.48	74.93	24.00	50.21	102.08	22.70	64.22	54.13	23.12	39.20	74.65	40.87	58.26
1922.....	61.70	55.91	58.84	35.64	11.54	23.90	75.78	22.41	50.24	20.07	19.52	19.81	59.27	35.56	47.74
1923.....	55.03	52.43	53.74	41.62	40.45	41.05	74.45	21.12	48.77	19.91	17.17	18.59	56.53	35.91	46.46
1924.....	67.04	52.82	60.00	50.93	36.38	43.77	84.54	23.41	55.01	14.71	22.25	18.33	65.47	37.08	51.59
1925.....	65.65	62.14	63.91	73.89	40.51	57.42	74.27	21.84	48.87	30.01	12.59	21.65	65.19	39.68	52.70
1926.....	58.97	57.36	58.18	49.23	39.85	44.64	95.54	24.41	61.09	24.89	16.22	20.68	67.29	38.90	53.41
1927.....	61.36	59.87	60.62	71.95	28.73	50.78	78.78	17.87	49.20	24.58	12.98	18.94	64.30	36.10	50.50
1928.....	60.72	56.51	58.64	54.99	25.55	40.56	85.08	20.74	53.75	31.76	15.74	23.96	65.61	35.69	50.95
1929.....	57.98	51.63	54.85	44.58	22.56	33.78	72.48	18.08	45.95	22.16	17.47	19.87	57.70	32.54	45.37
1930.....	62.20	50.58	56.46	51.74	31.51	41.81	73.84	18.96	47.09	23.47	6.87	15.36	61.05	31.96	46.78
1931.....	55.79	55.75	55.77	54.26	26.34	40.54	64.26	15.05	40.33	24.81	11.92	18.49	55.41	32.62	44.22
1932.....	51.02	54.55	52.77	58.63	24.66	41.92	59.19	16.40	38.37	20.02	15.83	17.96	51.49	32.84	42.33
1933.....	57.48	54.40	55.95	46.86	18.64	32.96	52.21	14.58	33.88	22.86	6.90	15.01	50.60	30.44	40.68
1934.....	50.85	50.23	50.54	50.31	26.97	38.81	52.30	16.50	34.85	19.03	12.77	15.95	47.93	30.88	39.54
1935.....	50.84	56.88	53.84	42.18	28.57	35.47	51.90	17.47	35.12	14.26	25.44	19.77	46.51	35.41	41.05

Prior to 1921 certified deaths only were included.

M. = Males; F. = Females; P. = Persons.

The national scheme which had been formulated for dealing with tuberculosis as announced in the Department's annual report two years ago was brought a little nearer to fruition. The marked increase in the amount refunded to local authorities on expenditure incurred in treating persons suffering from tuberculosis during last year would seem to indicate that more active measures are being adopted by local authorities in dealing with this disease, due no doubt to the additional financial aid afforded by the terms of the provisions of the Public Health (Amendment) Act, 1935.

The scheme of extensions to the Sanatorium at Nelspoort are well advanced and it is anticipated that the European ward block will be ready for occupation within the next six months. Financial provision has been made for an additional ward block for non-Europeans and the work of construction will no doubt be undertaken as soon as possible.

At Rietfontein the new ward block for acute and chronic non-European cases has been completed and will provide accommodation for fifty-three patients.

In Capetown plans for additional accommodation for cases of pulmonary tuberculosis at the City Hospital, have been approved and it is anticipated that the work will be undertaken forthwith. As indicated in last year's report, the scheme for the erection of a new isolation hospital, consisting of fifty beds for infectious diseases cases and seventy-five beds for cases of pulmonary tuberculosis, was proceeded with. Owing, however, to unforeseen circumstances progress has been somewhat delayed. The plans have now, however, been approved and it is anticipated that the work on the construction of the institution will be commenced in the near future.

The object of the tuberculosis section of the proposed hospital is to provide accommodation for patients requiring investigation prior to transfer to a sanatorium for further treatment and for the accommodation of such patients as are unsuitable for treatment in a sanatorium.

In Durban, the building of the new tuberculosis hospital at Springfield is making disappointingly slow progress. It has become increasingly apparent that the success or otherwise of anti-tuberculosis work in Natal is going to depend largely on the effective functioning of the tuberculosis clinics and particularly the aftercare arrangements. The cases, including the bulk of the non-Europeans will probably come from the urban and peri-urban areas. It seems clear that the effective handling of tuberculosis in the province is going to depend mainly on the whole-hearted co-operation of local authorities and all concerned. A systematised follow-up of cases directed from a central organisation will be an essential portion of the scheme.

In Port Elizabeth the building of the new infectious diseases hospital with a large tuberculosis section has still to be commenced, and it is hoped that the Town Council there will do all in its power to press on with the project.

There are still large native areas from which widely differing reports have been received as to the incidence of the disease. Many of these reports are founded on native hearsay. But unfortunately undoubted evidence is beginning to accumulate that the disease is making serious inroads on the health of natives even amongst those who have not been exposed to urban or mining conditions. We have the evidence of many medical men practising in these areas. More recently, as a result of reports that the disease was attacking native children of school age, the department, with the sanction of the Cape Provincial Administration, arranged for the District Surgeon, Bizana, to examine the children attending the native schools in his district. In a detailed report, Dr. Westlake Wood, the District Surgeon referred to, stated that after examining 2,252 children he found that 4.5 per cent. of the children were suffering from tuberculosis and that 3.9 per cent. of all children examined were pulmonary cases of the disease.

The department has carefully considered the question of the most satisfactory way of meeting the needs of these people, and it seems clear that what is required to commence with is a tuberculosis hospital for the Ciskei at Lovedale and the provision of additional beds for these cases at Umtata, together with the appointment of a tuberculosis officer to study the disease on the spot when these hospitals are established. The further needs of these territories and indeed of native areas generally would probably be best met by arranging, in connection with existing or projected hospitals, for the establishment of locations in selected areas in which discharged patients could live and work under some medical supervision with their families.

*Nelspoort Sanatorium* continued to do valuable work. Three classes of patients are admitted:—

- (1) *Free Patients*.—A quarter of the cost of treatment is paid by the local authority and a quarter by the Provincial Administration concerned, the remainder being paid by the Department of Public Health.



- (2) *Part-paying Patients*.—In this case the patient pays a contribution towards the cost of his treatment, the balance being paid in the same proportions by the authorities above-mentioned.

In these two classes of patient, application for admission must be submitted by the local authority, which guarantees payment of the agreed amount in each case. The tariff per patient per day is fixed periodically by the Treasury on the advice of the Advisory Committee—representing the Cape local authorities, the trustees of the late Mr. Garlick, and the Government.

- (3) *Full-paying Patients*.—The institution was not intended for full-paying patients, but as in the early years the other classes of patients did not take up all the beds, and as applications were received from people willing to pay the full rates, such patients were admitted at a tariff of 12s. 6d. a day.

The following table summarizes the work of the institution during the year:—

TABLE K (iii).—ADMISSIONS, DISCHARGES AND DEATHS DURING THE YEAR ENDED 30TH JUNE, 1936.

	Total.	European.			Non-European.		
		Male.	Female.	Total.	Male.	Female.	Total.
In Sanatorium on 1st July, 1935	97	31	31	62	18	17	35
Admitted during year.....	243	79	48	127	79	37	116
TOTAL.....	340	110	79	189	97	54	151
Died during year.....	11	2	2	4	4	3	7
Discharged during year.....	230	77	44	121	68	41	109
TOTAL.....	241	79	46	125	72	44	116
In Sanatorium on 30th June, 1935	99	31	33	64	25	10	35

The patients admitted during the year were in the following stages of the disease:—

Race.	Stage I.	Stage II.	Stage III.
European.....	18·11 per cent.	46·45 per cent.	35·43 per cent.
Non-European.....	12·06 per cent.	38·79 per cent.	45·34 per cent.

Of the 243 admissions during the year, 223 were free, 10 were part-paying or contributing, and 10 were full-paying patients.

The daily average number of patients was 96·76 and the average stay of patients was Europeans, 183 days, and non-Europeans, 105 days.

11. *Typhus (Rickettsiosis)*.—Three of the typhus-like diseases are encountered in Southern Africa, namely tick typhus (locally known as tick-bite fever), South African rat-flea typhus and louse typhus. Only the last of these is of any serious importance in Southern Africa, the other two very rarely giving rise to severe symptoms. From the discussions at the Pan African Health Conference held in November it appeared that all three diseases occurred in the Union; in Southern Rhodesia, Swaziland and Mozambique only tick typhus is recognised, and in Belgian Congo only rat-flea typhus. Louse typhus, the great scourge of the Bantu in the Union, occurs also in South West Africa, Basutoland, Ruanda-Urundi and on the Uganda slopes of the Mufimbiro Mountains.

TABLE L (i).—TYPHUS FEVER IN THE UNION: CASES AND DEATHS REPORTED SINCE 1923, FOR YEARS ENDING 30TH JUNE.

Year.	Cases.	Deaths.
1923.....	7,099	755
1924.....	2,122	382
1925.....	1,144	163
1926.....	1,135	146
1927.....	895	136
1928.....	1,331	208
1929.....	1,480	193
1930.....	1,782	212
1931.....	1,541	261
1932.....	1,550	292
1933.....	2,125	302
1934.....	5,956	662
1935.....	6,826	998
1936.....	1,605	284

The incidence of louse typhus in the Union of South Africa is difficult to estimate. The cases actually reported probably constitute only a small proportion of the total. Most of the mild cases are unrecorded. The recorded cases for the past fourteen years are tabulated in Table L (i). The fall in numbers to 1,605 as contrasted with 6,826 the year before is striking. It may be attributed firstly to a lessening of the number of susceptible natives owing to the large numbers who had contracted the disease during the previous three years and had thereby become immunized against reinfection. The second, and probably very much more important, reason is the return of some measure of prosperity (if such an expression could be justified) among the natives in the Reserves.

TABLE L (ii).—REPORTED CASES OF TYPHUS IN THE PROVINCES OF THE UNION FOR YEARS ENDING 30TH JUNE.

Year.	Cape.	Natal.	O.F.S.	Transvaal.	Total.
1923.....	6,118	356	425	200	7,099
1924.....	1,392	241	286	203	2,122
1925.....	579	218	220	127	1,144
1926.....	701	87	272	75	1,135
1927.....	638	72	168	17	895
1928.....	1,154	91	68	18	1,331
1929.....	1,320	65	84	11	1,480
1930.....	1,564	57	149	12	1,785
1931.....	869	62	53	557	1,541
1932.....	1,263	51	40	196	1,550
1933.....	1,649	208	243	25	2,125
1934.....	1,905	207	3,636	208	5,956
1935.....	2,898	224	3,275	429	6,826
1936.....	835	33	280	457	1,605

From Table L (ii) it will be seen the bulk of the infection continues to be in the Cape Province due to the large population of poverty-stricken natives in the eastern portion of that province.

TABLE L (iii).—TYPHUS NOTIFICATIONS AMONG EUROPEANS IN THE UNION FOR YEARS ENDING 30TH JUNE.

Year.	Cape.	Natal.	O.F.S.	Transvaal.	Total.	
					Cases.	Deaths.
1923.....	39	3	8	6	56	6
1924.....	26	8	10	2	46	3
1925.....	13	19	2	3	37	0
1926.....	22	25	6	2	55	1
1927.....	13	21	4	1	39	2
1928.....	18	30	3	1	52	0
1929.....	27	17	1	0	45	0
1930.....	34	33	2	5	74	5
1931.....	26	21	3	3	53	2
1932.....	25	7	1	0	33	2
1933.....	43	9	1	1	54	3
1934.....	23	10	12	0	45	3
1935.....	38	16	29	14	97	5
1936.....	20	13	3	4	40	2
TOTAL.....	367	232	85	42	726	34

That the European population does not entirely escape infection is shown by Table L (iii). With such extensive infection among our native population it is inevitable that spread to Europeans, even if they live under sanitary conditions free from louse infestation, must occur.

TABLE L (iv).—TYPHUS FEVER: CASES AND DEATHS REPORTED DURING THE YEARS ENDING 30TH JUNE.

Province.	Number of Districts in which Outbreaks Occurred.	European.		Non-European.		Total.	
		Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cape.....	52	20	1	815	120	835	121
Natal.....	12	13	1	20	6	33	7
Orange Free State.....	19	3	—	277	48	280	48
Transvaal.....	11	4	—	453	108	457	108
UNION.....	94	40	2	1,565	282	1,605	284



The distribution of the cases reported during the year under review is shown in Table L (iv).

The preventive measures adopted continue to be various methods of delousing blankets, clothing and the human body. The delegates from other countries at the Pan African Health Conference were in entire agreement with the Union authorities, however, that no real progress against the spread of typhus can be made without greatly improving the economic status of the natives in the States affected, lousiness being a direct result of low economic status.

12. *Venereal Diseases*.—Public interest in these diseases continues. Unfortunately, though the attitude is not singular to South Africa, this interest only too often expresses itself in demands and resolutions of an impracticable and ignorant nature. Wholesale compulsory examination and treatment are the usual procedures put forward, and further, the Government is regularly urged to introduce such class and race discriminatory measures as compulsory medical examination of non-European female servants.

Such views reveal the distorted attitude to venereal diseases of large sections of the public. Wise education of the lay person as to the nature and extent of the problems of syphilis and gonorrhoea is to be welcomed, as there would then develop an appreciation of the difficulties to be faced in controlling these diseases. Compulsory examination and treatment of any section of the community, except in very special circumstances, can accomplish little. The definite diagnosis of many phases, even highly infectious phases, may be extremely difficult and involve complicated laboratory technique. Further a single examination is useless as a guarantee of freedom from infection for any length of time. The futility of compulsory or "police" methods of handling the problem has been demonstrated in most countries attempting them.

The usual basis of successful programmes of combating syphilis and gonorrhoea is the provision of attractive, convenient treatment, administered with sympathetic consideration for the patient. Venereal diseases in many stages are not superficially obvious, and in securing the trust and co-operation of the patient, the evil results of concealment are avoided. It is on this principle that the venereal disease policy in the Union is largely based. The Department attempts to secure free, convenient treatment in all areas through generous refunds on venereal disease schemes instituted by local authorities, through the free provision of certain drugs and through the services given in rural areas and in urban areas lacking local departmental services by the district surgeoncy system.

The past year has seen the establishment of several new venereal disease schemes and the extension of many other arrangements. Several of these arrangements are being kept under observation in determining the most suitable machinery for different populations and different districts. In the rural areas of the Cape, for instance, two schemes which thus far are functioning satisfactorily, may be taken as examples suitable for imitation and elaboration. These are the schemes of the Paarl and Stellenbosch Divisional Councils. They consist of simple district clinics visited at regular intervals by the medical officers; they are related to small central infectious disease hospitals. Both these areas report most successful and encouraging responses to the establishment of the district clinics.

In the urban areas of the Cape Province there is much variation in the efficiency and extent of venereal disease organisation. The elaborate efforts undertaken by the City of Capetown are well known and are undoubtedly the most highly organised and efficient in existence in the Union. A different and necessarily smaller scheme is that functioning in Port Elizabeth, where the venereal disease clinic is housed in a general clinic building. This method of co-ordinating venereal disease treatment with other medical functions of a health department has much to commend it, and as practised in Port Elizabeth confirms the views expressed in other parts of the world that usually the polyclinic has many advantages over the "*ad hoc*" clinic. As an instance of another scheme evolving on yet other lines, Umtata may be quoted. A group of huts forms an isolation unit, where all non-European patients undergo treatment under detention for the course. But the significant aspect of the operation of the scheme is a most successful arrangement for bringing "sources" of infection under treatment. This is an especially valuable public health measure, and it is to be hoped that other centres will similarly devise methods of overcoming the difficulties of bringing infected persons under treatment.

In Natal the urban areas of both Durban and Pietermaritzburg are continuing to develop their organisations for dealing with the disease as seen in all classes of the population. The collieries of Northern Natal, however, present one of the most important and difficult problems in this Province, as in practically every instance there grows up on adjacent farms a casual community consisting of the families of the mine labourers, and various

“ hangers-on ” of whom prostitutes and liquor sellers are the most objectionable.

The Orange Free State was not distinguished by any unusual events during the year. Reports from local authorities and from district surgeons mentioned that the numbers receiving treatment showed no noteworthy change, and that similarly methods of treatment had not materially changed.

Prospective changes in certain Transvaal areas are most important. A great advance is to be recorded in this field as the result of the recent appointments of full-time medical officers of health for the majority of the Reef municipalities. Almost without exception these officers have indicated their active interest in this great public health problem, and at this early stage of the evolution of these new local health departments it is most satisfactory to report that plans are either complete or in preparation to provide for both European and non-European clinic treatment. Further progress in venereal disease control from the appointment of full-time officers follows indirectly from the interest they give to such fields as child and maternity health, location health conditions, etc., in which gonorrhoea and syphilis are such destructive forces.

As an additional measure to improve the situation on the Reef, an investigation is being made of the medical examinations conducted through the Native Labour Department at the Pass Offices. As a result of this investigation it is hoped it will be practicable to take steps which will render the detection possible of most cases arriving in this area in a grossly contagious state. Extraordinarily difficult conditions exist in such urban and industrial areas as the Reef. There are great problems concerning the non-European arising out of the social and political forces leading to segregation of the races, to disturbance of their tribal and family habits, and to neglect of their need for housing, social amenities and medical services.



TABLE M.—VENEREAL DISEASES: CASES TREATED AND ATTENDANCES, YEAR ENDED 30TH JUNE, 1936.

Locality.	In Hospital.				Outdoor.							
	Syphilis.		Gonorrhoea and Other Venereal Diseases.		Syphilis.		Gonorrhoea and Other Venereal Diseases.		Total.			
	European.	Non-European.	European.	Non-European.	European.	Non-European.	European.	Non-European.				
<i>(1) By District Surgeons.</i>												
Cape.....	32	1,345	16	258	48	1,603	460	15,638	323	991	783	16,629
Natal.....	5	745	16	114	21	859	80	4,608	63	415	143	5,023
Transvaal.....	92	1,117	11	136	103	1,253	619	41,957	369	664	988	42,621
Orange Free State.....	—	4	—	—	—	4	286	7,255	185	1,137	471	8,392
TOTAL.....	129	3,211	43	508	172	3,719	1,445	69,458	940	3,207	2,385*	72,665*
<i>(2) At Institutions and Clinics.</i>												
Aliwal North.....	—	—	—	—	—	—	21	209	—	—	21	209
Barberton.....	—	259	—	—	—	259	—	—	—	—	—	—
Bethlehem.....	—	46	—	9	—	55	—	—	—	—	—	—
Bloemfontein.....	2	161	28	49	30	210	370	3,283	408	56	778	3,339
Bochem.....	—	536	—	12	—	548	—	1,828	—	66	—	1,894
Boksburg.....	1	18	—	—	1	18	6	258	40	149	46	407
Capetown.....	43	231	51	43	94	274	6,762	13,784	5,472	3,749	12,234	17,533
Durban.....	35	759	71	194	106	953	489	1,842	4,149	3,901	4,638	5,743
East London.....	—	—	—	—	—	—	185	1,753	372	328	557	2,081
Elim.....	2	507.	1	16	3	523	2	160	—	—	2	160
Johannesburg.....	—	—	—	—	—	—	5,794	—	5,208	—	11,002	—
Kimberley.....	6	135	3	1	9	136	99	1,987	155	335	254	2,322
Kingwilliamstown.....	5	140	3	6	8	146	1	23	4	8	5	31
Kroonstad.....	—	—	—	—	—	—	—	2,804	—	—	—	2,804
Krugersdorp.....	4	63	7	—	11	63	36	68	64	4	100	72
Kuruman.....	—	25	—	—	—	25	—	163	—	—	—	163
Marianhill.....	—	—	—	—	—	—	—	383	—	—	—	456
Olifantshoek.....	—	—	—	—	—	—	8	412	—	1	8	413
Oudtshoorn.....	—	—	—	—	—	—	—	254	—	4	—	258
Pietermaritzburg.....	—	251	—	43	—	294	238	8,440	329	5,861	567	14,301
Port Elizabeth.....	—	—	—	—	—	—	1,501	6,862	1,388	1,265	2,889	8,127
Potchefstroom.....	—	—	—	—	—	—	30	2,732	—	—	30	2,732
Protoria.....	—	—	—	—	—	—	1,500	8,050	4,152	3,932	5,652	11,982
Rietfontein.....	89	3,859	204	993	293	4,852	218	1,784	—	—	218	1,784
Sekukuniland (Jane Furse Memorial).....	—	34	—	8	—	42	—	1,170	—	34	—	1,204
Somers West.....	—	—	—	—	—	—	5	83	3	—	8	83
Springs.....	—	—	—	—	—	—	—	1,185	—	2	—	1,187
Stellenbosch.....	—	17	—	—	—	17	—	758	—	—	—	758
Swellendam.....	—	24	—	—	—	24	—	—	—	—	—	—
Uitenhage.....	—	22	—	—	—	22	—	—	—	—	—	—
Vryburg.....	—	129	—	—	—	131	274	2,215	71	—	345	2,236
TOTAL.....	187	7,216	368	1,376	555	8,592	17,539	62,783	21,815	19,789	39,354†	82,572†

\* Patients only. † Attendances only.



In Table M are shown the number of cases which have come under treatment during the year. It must be understood that this table is not an index of venereal diseases in the Union. It is a record of the amount of work done and the number of cases treated. It is regrettable that many who use statistics have no conception of the care requisite in deducing true conclusions from them. The interpretation of medical statistics is an exact science, and any careless or malicious quotation is to be most strongly condemned. For instance the entirely false conclusion, that because attendances at a clinic or the number of cases have increased in one year relative to a previous year, that an increase in the amount of the disease in the community has resulted, is often drawn. Thus the increase in number of attendances, as well as the increase in actual cases shown in Table M as treated by district surgeons is not evidence that in 1936 venereal diseases in South Africa were more prevalent than in 1935. Many factors probably contribute to the difference. Greater provision of clinics, of district surgeon tours, a greater proportion of patients seeking medical aid, a better recognition by patients of the efficacy of treatment, an improved and sympathetic campaign to educate the public and so on, all undoubtedly played a part in the greater numbers of cases and the greater attendances per patient recorded in the table.

It will be noted that in the year under review district surgeons treated 2,385 Europeans and 72,665 non-Europeans, a considerable increase on the figures of the previous year which were 1,870 Europeans and 53,381 non-Europeans.

In the attendances of non-Europeans at clinics and institutions there were 82,572 attendances as compared with 88,756 last year. This is the only field not reporting increased work during the year. The general increase, especially in the cases seen by district surgeons, is indicative of the greater efforts made during the last year, especially in country districts to improve venereal disease services.

In the report of last year, mention was made of the intention of undertaking epidemiological studies of syphilis and gonorrhoea as an essential preliminary to the formulation of a more ambitious national programme. The medical officer detailed for this purpose has collected valuable information as to the methods available for determining the incidence and effects of these diseases, and has examined, as far as opportunity allowed, the possibilities of undertaking a scientific survey of the whole problem. He has also been able to observe several schemes operating in widely different types of communities and in various parts of the country.

It is not yet possible to assess accurately the havoc wrought in the population, but some broad suggestive indications are available. Firstly, syphilis is the disease most frequently seen in all clinics, but some recent reports suggest that in some areas the poorer classes of the community, i.e. the non-Europeans are now more readily submitting gonorrhoeal conditions for treatment. This confirms the suspicion that gonorrhoea has been so little seen in the past because these poorer and ignorant classes have tended to dismiss it as of minor importance, and have known that its more dramatic effects are, by then, quickly lost. Many observers also believe that many of the non-European races have a resistance and recuperative power which robs gonorrhoea of many very acute manifestations.

Another impression gained is that there exist regional differences in both incidence and in belief of European treatment amongst non-Europeans. Incidence is high amongst large sections of urban Cape Coloureds, amongst vagrant Basutoes, amongst certain tribes in Bechuanaland, and in certain tribes of the Northern Transvaal. Many district surgeons report too that a growing evil is the soliciting of returning mine labourers which is practised in the large recruiting and distributing centres in the native territories. These labourers arrive at these centres *en route* to their homes and with their money in their pockets, are easy prey of liquor sellers and prostitutes.

*Lymphogranuloma Inguinale.*—This disease, which is now recognised as being identical with climatic bubo, has been reported from practically all tropical, sub-tropical and temperate countries. Dr. M. H. Finlayson, in collaboration with Dr. F. W. F. Purcell of Capetown, published in 1935 a report of a case of *lymphogranuloma inguinale* occurring in a European in Capetown. Since the publication of this report three further cases of suspected *lymphogranuloma inguinale* occurring in Europeans in Capetown have been investigated. In each case the infection was diagnosed by animal tests and also by means of a Frei antigen obtained from Germany. Frei antigen has since been prepared in the Biological Control Laboratories and has been used on these cases to confirm the results obtained with the imported antigen. By the courtesy of Dr. C. K. O'Malley, of the City Health Department, Capetown, an examination of forty European males attending the Capetown Municipal Treatment Centres was carried out using carefully controlled Frei antigen. One case was found to react strongly to the antigen and an examination of the records of this case showed that two years



previously the patient had developed large inguinal buboes which had suppurated and healed spontaneously. There is little doubt that this was a case of *lymphogranuloma inguinale*. It is proposed to continue this survey of patients at the Municipal Treatment Centres during the coming year.

It would appear that his condition is more widely spread amongst Europeans in the Union than has been hitherto suspected. The three further cases mentioned above were brought to light following the publication of the report on the first case, and were encountered by general practitioners in Capetown in the course of their practice. Supplies of Frei antigen are kept at the Biological Control Laboratories, Capetown, and will be issued free of charge to any practitioner wishing to avail himself of this diagnostic agent.

## VI.—GENERAL.

1. *Housing and Slum Elimination*.—Full details of the working of the Housing Act, No. 35 of 1920, from the date of its commencement, are given in the report of the Central Housing Board for the calendar year 1935 (U.G. No. 18, 1936) which was laid on the Tables of Parliament. A summary of the position as at 30th June, 1936, is given in the following table:—

TABLE N.—HOUSING ACT No. 35 OF 1920.—WORKING FROM PROMULGATION (16TH AUGUST, 1920) TO 30TH JUNE, 1936.

Province.	Loan Applications Approved.			Loan Issues.	Number of Houses.														
	European.	Non-European.	Total.		Completed.	Under Construction.	Approved, but not yet commenced.	Total.	Total for European Occupation.	Total for non-European Occupation.									
	£	£	£																
(A) <i>Economic Housing.</i>																			
Cape.....	1,355,051	665,566	2,020,617	£ 1,939,791	7,017	50	204	7,271	2,209 (a)	5,062 (b)									
Natal.....	545,280	87,523	632,803	624,215	1,001	1	—	1,002	532	470 (c)									
Orange Free State.....	520,164	20,618	540,782	529,879	1,476	331	76	1,883	643 (d)	1,240 (e)									
Transvaal.....	1,130,423	249,169	1,379,592	1,318,191	3,667	47	217	3,931	1,520	2,411 (f)									
TOTAL.....	3,550,918	1,022,876	4,573,794	4,412,076 (g)	13,161	429	497	14,087	4,904	9,183									
B) <i>Sub-Economic Housing.</i>																			
Cape.....	109,859	249,181	359,040	337,116	1,317	6	72	1,395	465	930									
Transvaal.....	295,196	—	295,196	30,132	25	221	252	498	498	—									
TOTAL.....	405,055	249,181	654,236	367,248	1,342	227	324	1,893	963	930									
TOTAL (A) AND (B)...	3,955,973	1,272,057	5,228,030	4,779,324	14,503	656	821	15,980	5,867	10,113									

(a) Includes a hostel to accommodate 86 persons.

(b) Includes 1,337 single rooms in blocks, 8 barracks and 160 flats.

(c) Includes 3 barracks and 36 single rooms in blocks.

(d) Includes a hostel for European girl employees at Bloemfontein.

(e) Includes 24 single rooms in blocks, the balance of 845 representing the approximate number of dwellings to be built out of a total loan of £16,818 made to three Local Authorities for use exclusively in purchasing materials to be advanced to Coloured persons and Natives building their own homes.

(f) Includes 303 single rooms in blocks, 3 compounds and 13 hostels.

(g) Includes £1,236,417 re-issued out of repaid capital.



The period under review was noteworthy for the calling by the Minister of a conference on housing and slum elimination, which was held in Cape-town on the 16th and 17th January, 1936, and attended by Government, local authority and public utility company representatives, when the whole question of slum elimination and re-housing was discussed at length as it affected Europeans, Eurafrians, Asiatics and Natives, and the adequacy or otherwise of the existing machinery was fully debated.

Numerous suggestions for the amendment of the Slums Act, mostly of a minor character to facilitate its better working, were made. It was agreed to request that if, as expected, these could not be included in the legislative programme for 1936, a draft Bill should be prepared which, after consideration by the local authorities concerned, should be included in the legislative programme for 1937. In the event of the latter procedure being adopted it was requested that an amendment of the Housing Act dealing with the acquisition and expropriation of land required for Municipal Housing Schemes should be presented during the 1936 Session.

Some doubt appeared to exist at certain centres as to the exact shortage of houses, but eventually it was agreed that the figures collected by the Government after a survey of the eight larger towns (i.e. Bloemfontein, Capetown, Durban, East London, Johannesburg, Pietermaritzburg, Port Elizabeth and Pretoria) included in the First Schedule to the Slums Act might be taken as approximately correct. These figures represent a total shortage in these towns of 7,910 houses for Europeans, 11,221 for the coloured community, 6,941 for Asiatics, and 16,000 for natives.

It was decided that the minimum accommodation for Europeans and better class non-Europeans must consist of dwellings each comprising at least two bedrooms, a living room with kitchenette, a bathroom, closet and small outhouse. It was felt that the minimum accommodation for non-Europeans generally and the question of building non-European accommodation by civilized labour or otherwise must be left to the discretion of the local authority concerned.

The high customs duties on building materials were mentioned with a view to the Government exploring the possibility of reducing such duties.

The manner and scope of Government assistance in respect of housing schemes were fully discussed and it was made plain that without considerable increase in the amount of Government subsidy it would be impossible for local authorities to make much headway.

In the case of housing for the aged poor a scheme was suggested under which the Government should set aside a specific sum for subeconomic housing schemes which would be available free of interest to enable local authorities to erect dwellings for the aged poor and to hand over the management of such dwellings to local charitable institutions.

Resolutions dealing with the foregoing matters were passed by the conference and as an outcome of their consideration, the following action has been taken:—

- (i) *Sub-economic Housing*.—The interest rate on loans was reduced from 2 per cent. to  $\frac{3}{4}$  per cent. per annum with effect from 1st March, 1936 (Government Notice No. 273, dated 28th February, 1936), and circular No. 4, dated 23rd March, 1936, was addressed to each Urban Local Authority consolidating and amplifying the instructions previously issued regarding the granting of loans under the Housing Act and the conditions attached thereto.
- (ii) *Housing of the Aged Poor*.—A sum of £50,000 has been provided in the Loan Estimates for the financial year 1936-37 for granting loans for this purpose under the Housing Act, interest to be at the rate of 1s. (one shilling) or one-twentieth per cent. per annum, with redemption (calculated on an investment return of  $3\frac{1}{4}$  per cent. per annum) spread over a period not exceeding 40 years. The conditions governing the granting of these loans have been explained in a circular No. 12, dated 7th August, 1936, addressed to each Urban Local Authority.
- (iii) *Amendment of Housing Act*.—Act No. 31 of 1936 was passed repealing section 11 of the Housing Act, No. 35 of 1920, dealing with the acquisition and expropriation of land required for housing schemes and substituting therefor a procedure on the lines of that laid down in the Slums Act, No. 53 of 1934.
- (iv) *Amendment of Slums Act*.—A Bill is under preparation for introduction as soon as practicable in Parliament incorporating the various amendments recommended.



Activities under the Housing Act during the year centred largely on the furtherance and completion of schemes approved during the previous year, and the caution displayed by a number of the larger local authorities in embarking on new schemes was a noticeable feature. In the case of several schemes in contemplation delay was occasioned on account of opposition on the part of vested and other interests antagonistic to the proposal, in addition to which difficulties had also to be overcome in connection with the selection of suitable sites. At certain centres steps were under way for acquiring land in terms of section 17 of the Slums Act for rehousing purposes, and the local authority was awaiting the completion of the formalities in this connection before formulating proposals in support of fresh schemes.

The £150,000 provided for economic housing during the financial year 1935-36 was not drawn upon for the reason that re-issues from repaid capital in the hands of provincial administrations proved sufficient for meeting the requisitions, totalling £150,056, which were submitted during that year by local authorities for payment of work done and services rendered on approved schemes and dwellings. Repayments of capital before the due date by certain local authorities during the last two or three financial years accounted for provincial administrations having on hand at the close of those years fairly large balances of repaid capital remaining available for re-issue, but as those balances have now been practically absorbed drawings on Treasury funds have again been rendered necessary, and out of the £70,000 which has been provided for granting economic loans during the financial year 1936-37 advances totalling £14,690 were made during the first quarter thereof. The Government has agreed to increase by £500,000 its commitment for economic housing which now stands at £4,081,000.

In respect of subeconomic housing, for which the Government is committed to a sum of £5,000,000, advances to local authorities during the financial year 1935-36 absorbed £119,976 out of the provision of £250,000 made for that year, while out of the £750,000 provided for the year 1936-37 advances totalling £6,465 were made during the first quarter thereof. With several fresh large subeconomic schemes now maturing and building actively proceeding on a number of previously approved schemes there is every reason to anticipate that the drawings on the £750,000 provision for 1936-37 will be considerable, particularly if as is hoped the Government agrees to the loss of a local authority on subeconomic schemes being reduced to one half of that borne by the Government.

Under the limit now operating as prescribed by Administrators in terms of section 6 (2) of the Housing Act Utility Companies are precluded from receiving through the local authority a housing loan for financing a scheme in excess of 80 per cent. of the cost thereof, the Company having to find from some other source the balance of 20 per cent. Representations, however, have been made that the raising of this 20 per cent. balance is proving a source of delay and difficulty to such Companies in furthering their building programmes, and appreciating the very valuable work which several of the Companies have rendered in providing additional housing the department is anxious to remove any obstacles in the way of pursuing their activities. It may be possible under the discretionary powers vested in Administrators under section 6 (2) not to insist on the enforcement of the 80 per cent. limit referred to but to allow, if the local authority is so disposed, the granting of a loan up to 90 per cent. of the full cost of the scheme, and the question of whether, and if so to what extent, relief in the direction indicated can be afforded is at present under consideration.

The active enforcement of the Slums Act, No. 53 of 1934, is proceeding steadily, and apart from its application to the eight centres included in the First Schedule thereto (viz. Bloemfontein, Capetown, Durban, East London, Johannesburg, Pietermaritzburg, Port Elizabeth and Pretoria) the provisions thereof have been extended by Proclamations under section 1 (3) to ten further centres comprising Kingwilliamstown (P. No. 257 dated 20.12.34), George (P. No. 45 dated 8.3.35), Randfontein (P. No. 52 dated 13.3.35), Mossel Bay (P. No. 195 dated 17.9.35), Beaufort West (P. No. 196 dated 17.9.35), Germiston (P. No. 220 dated 21.10.35), Roodepoort-Maraisburg (P. No. 229 of 29.10.35), Grahamstown (P. No. 230 of 29.10.35), Graaff-Reinet (P. No. 12 of 7.1.36) and Oudtshoorn (P. No. 100 of 30.3.36). Applications have also been received and are under consideration for the extension of the Act to Worcester, Barberton and Paarl. An application for the extension of the Act to the Hoetjes Bay Village Management Board was refused owing to the local authority having no organised health staff.

Since the commencement of the Act up to the 30th June, 1936, 216 appeals (involving a total of 553 properties) against the declaration of a single set of premises as a slum have been dealt with under section 4 (10) comprising 170 (390 properties) from Johannesburg, 10 (77 properties) from Capetown, 2 (4 properties) from East London, 33 (73 properties) from Durban, and 1 (9 properties) from Beaufort West. In every instance the declaration of the local authority was upheld.



No appeal in terms of section 15 (3) against a refusal on the part of a local authority to rescind a declaration as a slum of a single set of premises has so far been received.

Up to the end of June, 1936, 11 applications for the Minister's approval in connection with the acquisition of land in terms of sections 17 and 18 were dealt with, namely 1 from Johannesburg and 10 from Capetown.

Surveys of Government-owned property at the various centres where the Slums Act is in operation are well advanced, and appropriate action is taken on the reports as received. With the exception of Durban where the work has been carried out under the supervision of the department's Senior Assistant Health Officer stationed there, the surveys have under a special arrangement been undertaken by the Municipality at centres where a whole-time Medical Officer of Health is employed while at the other centres where there is only a small municipal health staff the department carries out the survey as opportunity offers and can best be arranged.

2. *Housing of Industrially Employed non-Europeans in Natal.*—The systematic inspection of non-European housing conditions in rural areas in Natal commenced during the winter of 1935 was continued. These inspections were carried out by the department's inspectors during the malaria off-season—May to November. During the period November to May (the malaria season) very few new inspections, but many follow-up visits, were made. These visits have proved very valuable and have been appreciated in the majority of cases, as many difficulties and misunderstandings have been cleared up. The inspections were carried out during the cane cutting and milling season, in the case of the sugar-cane planters, whose estates formed 86 per cent. of those inspected. Only those estates with ten or more non-European employees resident on the estate have so far been inspected. In all, the conditions of the non-European housing on some 270 estates have been inspected and reported on. The owners of these have received written recommendations, framed within the scope of the Housing Regulations set forth in Government Notice No. 659 of 1915. From replies received, it would appear that many single unit estates are in depressed circumstances. There has been a tendency, extending back over a period of some years, for the single unit concern to become absorbed by the multiple-unit concern or company.

In view of this it was felt that estate owners—more especially the "small" man—should not be pushed too hard. Ample time and opportunity was granted, where this has been requested on reasonable grounds as permitted by the discretionary powers granted the department under regulation No. 20 of Government Notice 659 of 1915.

The majority of estates under consideration are situated in the following magisterial districts:—

Umzinto,  
Lower Tugela,  
Mtunzini.  
Lower Umfolosi.  
New Hanover.  
Umvoti.

Several estates in each of the following districts have also been inspected:—

Camperdown,  
Eshowe,  
Inanda,  
Krantzkop,  
Melmoth,  
Port Shepstone,  
Umgeni,  
Weenen.

All the estates under review are situate in rural areas; no inspections of housing in local authority areas, that is, town boards or health committees, have been carried out other than in the normal course of systematic health inspections. These latter are not included here. (In such local authority areas some of the non-European housing is excellent—e.g. at the African Explosives, Ltd., Factory, Umbogintwini Health Committee; while in others it is bad—e.g. at the Illovo Sugar Estates, Southern Umlazi Health Committee.)

The following tables summarise the various details in connection with the non-European housing under review:—

TABLE O (i).—HOUSING OF INDUSTRIALLY EMPLOYED NON-EUROPEANS IN NATAL: TYPES OF BUILDING.

Type of Building.	Total.	Percentage.
Wood and Iron.....	3,331	45·0
Brick.....	1,155	15·5
Wattle and Daub.....	990	13·3
Native Huts.....	779	10·5
Concrete.....	776	10·5
Shacks.....	389	5·2
TOTALS.....	7,420	100·0

Several of the larger estates have, under the direction of the department, already commenced the re-housing of their non-European employees. Such estates were not inspected in detail.

TABLE O (ii).—HOUSING OF INDUSTRIALLY EMPLOYED NON-EUROPEANS IN NATAL: SUITABILITY OF BUILDINGS.

Type of Building.	Totals.	Fit.		Alterable.		Unfit for Habitation.	
		No.	Per-centage.	No.	Per-centage.	No.	Per-centage.
Wood and Iron.....	3,331	259	7·7	1,792	54·0	1,280	38·3
Brick.....	1,155	200	17·2	917	79·0	38	3·8
Wattle and Daub.....	990	168	17·0	418	42·2	404	40·8
Native Huts.....	779	165	21·2	56	7·2	558	71·6
Concrete.....	776	233	30·0	541	69·7	2	0·3
Shacks.....	389	—	—	—	—	389	100·0
TOTALS.....	7,420	1,025	14·0	3,724	50·0	2,671	36·0

Thus a total of 7,420 dwellings has been inspected and reported on in detail. Of this number, 14 per cent. are regarded as satisfactory and fit for human habitation according to present standards; 50 per cent. as being defective but capable of satisfactory alterations to render them fit for human habitation; and 36 per cent.—more than one-third—as being so defective as to be totally unfit for human habitation and structurally incapable of satisfactory alterations. This means, in effect, that at the commencement of this campaign, on those estates under review, some 86 per cent. of the non-European employees and their dependents (where present) were living under unhygienic and unsatisfactory conditions.

TABLE O (iii).—HOUSING OF INDUSTRIALLY EMPLOYED NON-EUROPEANS IN NATAL: BUILDINGS SHOWING RELATIVE STANDARDS OF THE DIFFERENT TYPES.

Type of Building.	Satisfactory.		Alterable.		Unfit for Habitation.	
	No.	Per-centage.	No.	Per-centage.	No.	Per-centage.
Wood and Iron.....	259	25·3	1,792	48·1	1,280	48·1
Brick.....	200	19·5	917	24·7	38	1·4
Wattle and Daub.....	168	16·4	418	11·2	404	15·1
Native Huts.....	165	16·1	56	1·5	558	20·8
Concrete.....	233	22·7	541	14·5	2	0·1
Shacks.....	—	—	—	—	389	14·5
TOTALS.....	1,025	100·0	3,724	100·0	2,671	100·0

The sites of barracks and compounds were found to be generally satisfactory. The majority are situated on sloping ground, moderately well drained, and more or less isolated from neighbouring dwellings or compounds. Herein has been their greatest safety.

All estates have running river or stream water quite readily available, but only on one estate is filtered and chlorinated water provided.



TABLE O (iv).—HOUSING OF INDUSTRIALLY EMPLOYED NON-EUROPEANS IN NATAL: WATER SUPPLY.

Total Estates.	Rain Water.	Wells.	Boreholes.	Protected Springs.	Piped River Water.	Treated Water.
270	30	15	38	10	31	1

From Table O (iv) it will be seen that on 94 estates a more or less safe water supply is provided, and on 125 estates some provision is made to supply the compounds or barracks with water, but not necessarily treated or safe water. The balance depends upon raw river supplies for all purposes. Further, very few estates provide clothes-washing or ablution facilities for their non-European employees.

Sanitary arrangements are in many instances unsatisfactory, but improvement is taking place now. The position is set out in Table O (v).

TABLE O (v).—HOUSING OF INDUSTRIALLY EMPLOYED NON-EUROPEANS IN NATAL: SANITARY ARRANGEMENTS.

Year.	Estates.	No Provision.	Pit Privies.	Pail Closets.	Water Closets.	Total.
1935.....	270	232	32	4	2	38
1936.....	270	158	106	4	2	112

On the majority of estates there is no systematic *disposal of refuse*.

Building plans submitted by or on behalf of 120 estates have been approved by the department. In numbers of cases the submission of plans was not asked for, as minor alterations only were considered necessary: for example, the installation of extra window space (light). The progress in building construction is shown in Table O (vi).

TABLE O (vi).—HOUSING OF INDUSTRIALLY EMPLOYED NON-EUROPEANS IN NATAL: BUILDING CONSTRUCTION, 1935-1936.

Built.	Buildings Altered.	Vacated/Demolished.	Sanitation Improvements.
874	774	351	80

It will be seen that 1,648 non-European quarters have been newly built or so altered as to render them fit for human habitation. As the average "quarters" house five persons each, it is estimated that approximately 8,240 persons have been re-housed during the past twelve months.

The number of non-Europeans housed (employees and dependents) on the estates under review is roughly estimated at 28,000, made up as follows:—

<i>Estates.</i>	<i>Natives.</i>	<i>Indians.</i>	<i>Totals.</i>
270	14,000	14,000	28,000

It will be observed that the numbers of natives and Indians housed are approximately equal. Of the natives, about 95 per cent. are adult male labourers; of the Indians, about 50 per cent. are adult labourers, the balance being children and aged dependents.

In the sugar-cane belt the native employees fluctuate seasonally in numbers considerably, being highest during the cane-cutting and milling season (winter and spring) and may be reduced to about half their number during the "off season" (summer and autumn). It is on the former number that the department bases its recommendations, while the planter is in general disposed to house properly only what he terms his "permanent" labour—that is his "off season" labour.

The Indian estate population steadily increases. The bad custom prevalent among Indians of having the son's wife to live in the same house as the former's parents leads to overcrowding, quite apart from the often very urgent needs of the original family. To cope with the demands which



such an undesirable custom throws on the estates leads, very frequently, to one result. When an Indian "family" becomes too numerous, the housing provided generally running to one or two rooms and a kitchen only, such a family has to seek accommodation elsewhere. One of the questions now being asked an Indian on engagement is: "How many dependents have you?", whatever his age might be!

One of the direct effects of this housing campaign, particularly where the housing was condemned as being totally unfit for human habitation and irreparable, has been for the owner to drive most of his labour off his property to reside elsewhere. The native goes to the adjacent Reserve. The Indian moves to some nearby property, owned by either a European or another Indian and frequently situated on the outskirts of towns. This creates slum conditions and helps to constitute the notorious so-called "black belts" which menace so many towns in Natal.

On numbers of inland estates, particularly wattle estates, the "togg" system is in vogue. Under this system natives are allowed to build their own huts on sites approved by the owner. These huts or kraals are scattered all over the property, and not collected into compounds. It would appear that this type of housing is not covered by regulation, except in so far as they may from time to time become unfit for human habitation and so constitute a nuisance.

3. *Peri-urban Slums and Villages without any Local Government.*—These continue to raise the most important public health issues in Natal. The creation of local authorities is a function vested in the Provincial Administrations. In Natal the establishment of systems of local government appears to be only possible under existing circumstances when requests are received from enlightened communities who are desirous of carrying out effective local control of essential sanitary and public health services.

This department has, as a matter of policy, consistently advocated the extension of local government throughout the Union as the only effective method of ensuring improved sanitation and public health measures in the smaller urbanised communities, but in Natal progress generally in this direction has been slower than in the other Provinces.

As a result of the severe malaria epidemic during the years 1929-33 and the clamant demand of the people for means to rid the Province of this scourge, it was found possible by the Provincial Administration to establish one town board and sixteen health committees. The last health committee to be so created was that of Umzinto on the 13th December, 1933.

Where local authorities have been created a very great deal of progress in sanitation and public health has been effected in most of the communities concerned. There are, however, many communities which are urgently in need of local government such as Kranskop, Kloof, Hillcrest, and several recently established coastal townships such as Uvongo, Anerley, Southbroom, St. Michaels-on-Sea, many of which are rapidly expanding.

Further, it is largely due to inadequate local government that slum conditions and black belts on the outskirts of the larger townships have arisen. Reference was made in last year's report to the existing black belts surrounding Pietermaritzburg. Similar conditions also exist in respect of the smaller townships such as Stanger, Verulam, and Estcourt.

Apart from this, there appears to be considerable activity in creating private townships, and the department's attention has recently been drawn to the proposed establishment of non-European townships on the outskirts of Durban.

There is a Townships Board in Natal, to which body applications are submitted by any landowner desirous of establishing a private township. This body should be strengthened by the appointment of a health officer to it as obtains in the Cape, so that the board may be properly guided on questions affecting the public health.

4. *Slaughtering and Meat Inspection.*—The importance of adequate supervision of premises where the food of the public is prepared cannot be too often stressed. Abattoirs and slaughter houses in many parts of the country still leave very much to be desired.

During June an Assistant Health Officer carried out an inspection of the Abattoirs controlled by the Reef Municipalities. This inspection revealed considerable variation in the type of building, the methods of slaughtering and the arrangements for providing treatment of by-products and for cooling and freezing meat. The various defects seen were not entirely to be ascribed to antiquated buildings, as one instance of an abattoir of a poor design and arrangement was actually constructed as late as 1928.



The following requirements in abattoir design and accommodation must be considered essential in an urban community:—

- (1) A direct process from lairage to loading platforms along a path which is not crossed by other operations.
- (2) A lairage with impervious floor provided with easy drainage and cleaning facilities.
- (3) A system of races and casting pens as required by the Slaughter of Animals Act, 1934.
- (4) A slaughter hall, unencumbered with wall or room divisions, provided with maximum light and ventilation and with walls and floors of strong impervious material. An overhead railage system of modern design, which removes the necessity of switches is the most satisfactory.
- (5) A hanging hall of similar design and construction and of ample accommodation for carcasses to cool before removal for sale or to the cold storage.
- (6) A piggery preferably separate to the main slaughter hall.
- (7) An offal-cleansing department and tripery provided with ample hot water and steam, and constructed to give the maximum ventilation.
- (8) Cold storage with chambers for both frozen and chilled meat.
- (9) A by-products plant to treat blood, condemned meat, offal, heads, etc.
- (10) Efficient gutters and drains to remove slaughter hall and offal rooms' wastes.
- (11) Office accommodation and change rooms.

Several of the Reef abattoirs fall short of these requirements, the absence of cold storage and a by-product plant being common. Further expansion of the slaughter hall and precooling hall has not been visualised in the original design of some, and in one or two the procedure from lairage to loading platform curiously enough has not been planned along the straight direct line accepted as a primary consideration.

With these general remarks reference may now be made to individual abattoirs.

The Johannesburg abattoir and live stock markets form a great industry which is for ever expanding in efforts to cope with the demands of the growing population. Its management is a credit to all concerned. It is handicapped by its limited area in an urban district, but by the adoption of the vertical form of abattoir, the defects of lack of land are being overcome. Lairage, slaughter halls, hanging rooms and cold storage are of good construction and design.

Benoni possesses a model abattoir of excellent construction and design.

The original design of the Boksburg abattoir cannot be considered satisfactory as the process from assembly pen to loading platform is not direct, the slaughter hall is not of simple open design, and methods of draining the area and removing waste products are complicated.

At Brakpan, though the abattoir is administered efficiently it too suffers from original defects, especially in the devious route taken from lairage to loading platform, and in the absence of cold storage and a by-products plant.

The Germiston abattoir is old, but of simple, efficient design and good construction. It has certain minor defects in poor changing rooms, piggery, and the absence of impervious paint on the cold storage walls.

At Krugersdorp the old abattoir was definitely a disgrace to the town but in the new buildings the town possesses ample and ideal slaughtering and cold storage accommodation.

At Randfontein again there is an old abattoir which is, however, satisfactory in its main features. The lack of cold storage is the chief defect.

The Roodepoort abattoir suffers through its accommodation being insufficient to deal with the volume of stock passing through, and in the absence of cold storage accommodation. There is room for improvement in the methods of disposing of waste products.

The present abattoir at Springs is not in keeping with a progressive urban area, and it is therefore satisfactory to learn that modern premises are under consideration. The existing defects of inadequate accommodation, bad design and lack of cooling and by-product treatment can thus be overcome.

In general, attention had to be drawn to the primitive methods of conveying meat existing in some areas. The utmost care and cleanliness should be observed in this important matter to prevent fly and dust contamination and damage to meat through rough handling.



Finally, the inspection led to the conclusion that those local authorities which have not themselves really expert staffs would benefit considerably and frequently avoid error and expense in this and other health matters if the assistance of Government Departments' was more usually invoked. Such Departments as Public Health and Agriculture desire to develop to the full methods of providing expert advice in securing uniform health progress and co-operative development.

*Measles*.—Last year figures were quoted from various large municipal abattoirs to demonstrate that the degree of infestation of our slaughter animals with measles and the risk of tapeworm infestation to human beings had become a matter of serious national importance. The subject has since received the serious consideration of various congresses of farmers, medical men and others. A brief description of the causal parasite will, therefore, not be considered out of place.

A tapeworm, as the name implies, is a long, flat worm. It is narrow at one end and becomes broader at the other end. The narrow end bears the head, which is armed with suckers and sometimes also hooks, by means of which the worm clings to the intestinal wall of its host. The body consists of a large number of joints or segments. These are formed behind the head and gradually grow larger as they are pushed back by younger segments. Each one forms within itself a large number of eggs which remain in the egg-sac of the segment. Eventually the segments become "ripe" and, reaching the hind end of the worm, they break off and are passed out of the host.

The host animal cannot get tapeworms by swallowing these eggs.

The first part of the development must take place in another animal known as the "intermediate host". When this animal swallows the eggs they hatch and the small worms invade the body, developing into bladderworms in various parts. The bladderworm consists of a tapeworm head surrounded by a sac filled with a watery fluid. Measles in cattle and pigs are such bladderworms.

If the host animal now eats the bladderworms they develop into tapeworms in its intestine.

There are two different kinds of large human tapeworms. The one, *Taenia saginata*, is the adult form of the beef measle, *Cysticercus bovis*. The other, *Taenia solium* develops from the pig measle, *Cysticercus cellulosae*. These tapeworms grow to a length of 20 to 30 feet and can live for 12 to 20 years or even longer. Each produces 3 to 5 ripe segments daily which contain an average of 250,000 eggs. The ripe segments are about  $\frac{1}{2}$ - $\frac{3}{4}$  inch long by  $\frac{1}{4}$ - $\frac{1}{3}$  inch broad, white in colour and they often move about after being passed out. The eggs are very minute and have thick, tough shells. They may be spread about by water, wind, flies, dung beetles, birds, etc., and may get into the water and food of animals. It is clear that one infected person can spread about an enormous number of tapeworm eggs for many years unless hygienic measures are observed.

The beef measle develops in cattle which become infected through eggs passed by a person harbouring a *Taenia saginata*. At present only cattle are definitely known to carry this measle. The measles occasionally seen in the flesh of wild antelopes are bladderworms of tapeworms which occur in lions, hyaenas and other wild carnivores. Man can infect himself with the beef measle but this happens very rarely.

The pork measle similarly develops in pigs which swallow eggs passed by a person who harbours a *Taenia solium*. This measle can also develop in dogs and in man himself, where they sometimes occur in the brain and cause epilepsy and other disturbances.

In cattle and pigs the measles occur most frequently in the muscles of the jaws, the tongue, the heart, the shoulder and thigh and the diaphragm. They may live for years and no remedy is known which can kill them in the live animal. Such animals are usually quite healthy and can safely be used for breeding purposes, but not for human consumption.

Man acquires these tapeworms only from eating beef or pork which contains live measles, and cattle and pigs acquire measles only from infected human beings.

Man can protect himself against infection by hygienic measures: meat inspection, thorough cooking of beef and pork and keeping the meat for not less than 14 days in cold storage before using it. In spite of all this human tapeworms are not uncommon. Cattle and pigs are hardly protected at all, and in different parts of the country the infection with measles in pigs ranges from 6 to 10 per cent. and in cattle from 1 to 6 per cent. This means a great economic loss to the stockowner.



In order to reduce and eventually to eradicate this parasitic infection several different measures have to be taken:—

- (1) Meat inspection should be carried out strictly on all animals slaughtered for human consumption. This is difficult in the case of small communities, but should be aimed at wherever possible.
- (2) Beef and pork should be well cooked.
- (3) Every stockowner should protect his animals against measles by controlling human infection.

It is the third of these measures which offers the greatest hope of success. As has been pointed out above, the tapeworms which infest man can only produce measles in domestic animals if these animals gain access to the excrement of the human hosts. On stock farms it is therefore imperative that adequate sanitary accommodation be provided for native employees.

Such accommodation is still sadly lacking on most farms and that is the immediate and obvious reason for the prevalence of measles in the Union. Many farmers consider that the provision of such sanitary accommodation for crude natives would be quite useless. Yet it is surprising how soon employees can be educated up to the use of privies. It is necessary of course that such privies be conveniently placed at the homes and working places. With a little supervision, particularly at their first introduction, sanitary habits soon become firmly established.

The privies can be constructed at extremely little expense. All that is needed is a pit dug at points where there is no danger of contaminating underground water-supplies. Each pit is covered by a lidded seat so constructed that flies cannot gain access to the faeces in the pit.

Another even simpler if cruder method is to fence off areas of the farm allowing labourers to use only such areas for defecation. Since animals cannot enter these areas the risk of their becoming infested is greatly reduced.

If these comparatively simple measures were generally adopted on our stock farms, measles would in a comparatively short time be very largely eliminated from the animals used for meat production.

The financial loss to farmers because of the fact that it is illegal to sell measly meat is tremendous. To combat this loss elaborate insurance schemes have been developed. Insurance against financial loss to farmers whose stock develop measles, viewed from the national health standpoint, is deplorable. Its effect is to relieve the farmer of efforts to prevent his stock becoming infected. As the best system of meat inspection will yet allow of some infected meat reaching the public, our aim should obviously be to deal with this problem at the source, namely on the farm.

The matter was discussed in detail at the Pan African Health Conference held at Johannesburg in November, 1935, after submission of a paper compiled by Dr. H. O. Mönnig, Helminthologist at Onderstepoort, and presented by the Director of Veterinary Services, Dr. P. J. du Toit. The Conference recommended "the abolition of all insurance schemes intended to compensate farmers for slaughter animals found to be infected with measles; and urged that an endeavour be made to improve hygienic conditions on farms and the taking of all steps necessary to prevent the infection of animals with *Cysticercus*."

Acting on this recommendation this department approached the various bodies concerned. The Department of Agriculture and Forestry agreed that the improvement of hygienic conditions on farms was the most important method of controlling measles; but pointed out that the insurance schemes referred to in the resolution were administered by local authorities and did not fall under the control of that department. Thus the insurance scheme in operation at the Johannesburg Municipal Abattoirs was inaugurated in pursuance of powers vested in Municipal authorities by virtue of the provisions of the Local Government Ordinance, 1912, as amended by Ordinance 6 of 1918. Any legislation designed for the abolition of such insurance schemes would consequently also involve interference with existing provincial ordinances. Though the Department of Agriculture has, therefore, no *locus standi* in the matter it has undertaken to devote itself to propaganda amongst farmers with a view to encouraging the application of more effective sanitary measures in order to minimise the incidence of the disease.

The matter has also been taken up with municipalities. Johannesburg has already taken satisfactory action with regard to export cattle. In that city an indemnity fund has been established for the purpose of indemnifying owners of carcasses or portions of carcasses condemned at the municipal abattoir, for such diseases as may be specified by the City Council. In the case of cattle, the premium is 1s. 6d. per head and the full price realised or an agreed valuation is paid out in the event of condemnation for any

disease. Indemnification is optional, and the Council has the right to refuse to indemnify any animals presented. On representations from this department the Council replied that the question of measles was receiving careful consideration. Meanwhile the following restriction in the indemnification of export cattle against helminths was being enforced: "If measles are found in a consignment, no further indemnification is given until three further consecutive consignments free from bladder-worm are received."

5. *Infant Welfare*.—As will be seen from Table P (i), the European infantile mortality rate shows a disappointing increase of from 60·79 per thousand births in 1934 to 62·81 per thousand births in 1935. There has not been a steady decrease in this figure during the last 10 years, but a fluctuation, with a tendency to drop. The figures for 1934 were the lowest recorded. The increase this year is accounted for by a decided rise in the infantile mortality figures in Natal and the Transvaal, which outweigh the decrease shown in the Cape and Orange Free State. The rate is, however, still much lower in Natal than in the other provinces, and much the highest in the Transvaal. Economic conditions in the Northern Transvaal, plus malaria and a lack of nursing facilities and child welfare activities no doubt play a large part in this.



TABLE P (i).—EUROPEAN INFANTS: BIRTHS AND DEATHS UNDER ONE YEAR REGISTERED AND INFANTILE MORTALITY RATE, I.E. DEATH RATE PER 1,000 BIRTHS, 1919-1935.

Year.	Cape.			Natal.			Transvaal.			Orange Free State.			Union.		
	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.	Total European Births Registered.	Deaths of European Children under One Year.	Death-rate per 1,000 Births.
1919.....	16,749	1,351	80.66	2,910	191	65.64	15,338	1,326	86.45	4,727	382	80.81	39,724	3,250	81.81
1920.....	18,425	1,654	89.77	3,256	235	72.17	16,768	1,576	93.99	4,996	448	89.67	43,445	3,913	90.07
1921.....	18,062	1,382	76.51	3,370	203	60.24	16,582	1,374	82.86	5,288	379	71.67	43,302	3,338	77.09
1922.....	18,248	1,294	70.91	3,294	180	54.64	16,370	1,292	78.92	4,920	357	72.56	42,832	3,123	72.91
1923.....	18,296	1,353	73.95	3,229	197	61.01	15,610	1,261	80.74	5,037	328	65.12	42,181	3,139	74.42
1924.....	18,730	1,296	69.19	3,410	273	80.06	15,287	1,171	76.60	4,919	382	77.66	42,346	3,122	73.73
1925.....	18,366	1,343	73.12	3,509	206	58.71	16,348	1,059	64.78	5,188	361	69.58	43,411	2,969	68.39
1926.....	18,675	1,196	64.04	3,588	189	52.68	16,304	1,186	72.74	5,309	273	51.42	43,876	2,844	64.82
1927.....	18,537	1,293	69.75	3,435	166	48.32	17,050	1,359	79.71	5,325	314	58.97	44,347	3,132	70.63
1928.....	18,032	1,240	68.77	3,514	184	52.36	17,949	1,370	76.33	5,318	365	68.63	44,813	3,159	70.49
1929.....	19,008	1,169	61.50	3,650	177	48.49	18,227	1,342	73.63	5,334	280	52.49	46,219	2,968	64.22
1930.....	19,468	1,332	68.37	3,641	159	43.65	19,108	1,386	72.54	5,317	300	56.42	47,534	3,177	66.84
1931.....	19,180	1,182	61.63	3,538	162	45.79	18,733	1,267	67.65	4,975	317	63.72	46,423	2,928	63.07
1932.....	18,284	1,205	65.90	3,373	204	60.48	18,376	1,402	76.30	4,911	271	55.18	44,944	3,082	68.57
1933.....	17,931	995	54.49	3,441	166	48.24	18,452	1,266	68.61	4,695	299	63.68	44,519	2,716	61.01
1934.....	17,642	1,022	57.93	3,310	157	47.43	19,327	1,279	66.18	4,599	270	58.71	44,878	2,728	60.79
1935*.....	18,242	1,016	55.70	3,441	167	48.53	21,109	1,537	72.81	4,925	277	56.24	47,717	2,997	62.81

\* Preliminary figures only.

6. *Maternal Welfare.*—By the maternal mortality rate is meant the death-rate which is directly or indirectly due to child-bearing. This rate shows considerable variation in different countries, mainly on account of differences in classification and partly on account of incomplete returns. Indeed it is still doubtful whether the statistics published are prepared in such a way as to enable any really accurate comparisons to be made between the figures given for different countries. One can, however, say that generally speaking, in most countries the maternal death-rate appears to be relatively stationary. It shows little tendency to decline: indeed in some countries it seems to be rising instead of falling.

The question of maternal mortality has been under consideration for many years past throughout the world. It has been the subject of official inquiries in England which began with the report by Sir Arthur Newsholme to the local Government Board in 1915.

One aspect after another of this vast subject has been patiently explored and reported on at length, both by the Ministry of Health at Whitehall and by the Scottish Department of Health. Departmental committees have been set up, specially qualified investigators have explored particular aspects of the problem and voluminous reports have been presented. The United States followed the United Kingdom with reports dealing with the whole country by the Childrens Bureau of the United States Department of Labour in 1926, and later by committees set up by President Hoover's White House Conference in 1930 while another dealing with New York City was published by the Academy of Medicine of New York.

It has also been the subject of a special study by the Health Organisation of the League of Nations.

Notwithstanding all this inquiry and the measures taken as a result thereof, there appears to be so far, little sign in most countries of any appreciable reduction of mortality in child-bearing.

The average rate throughout the world where statistics of any value are kept appears to be about 4·3 per 1,000 live births. The figures for Denmark, Norway and Finland appear generally to be substantially under this figure, while the figure for England and Wales appears to be over 4, and that for the United States about 5·9.

The European rate for South Africa is shewn in Table P (ii). The total number of births and deaths recorded in this country is, of course, very small and this factor is responsible to some extent for the fluctuations in our rates from year to year.

TABLE P. (ii).—MATERNAL MORTALITY: EUROPEANS.

Year.	Live Births Registered.	Deaths due to Puerperal Causes.				
		Number.		Rates per 1,000 Live Births.		
		Puerperal Sepsis.	Other Puerperal Causes.	Puerperal Sepsis.	Other Puerperal Causes.	Total Puerperal Mortality.
1926.....	43,876	88	112	2·06	2·50	4·56
1927.....	44,347	101	112	2·28	2·53	4·81
1928.....	44,809	102	121	2·28	2·70	4·98
1929.....	46,219	140	103	3·03	2·23	5·25
1930.....	47,536	119	131	2·50	2·76	5·26
1931.....	46,423	116	102	2·50	2·20	4·70
1932.....	44,944	126	113	2·80	2·51	5·31
1933.....	44,519	113	101	2·54	2·27	4·81
1934.....	44,878	121	148	2·69	3·30	5·99
1935.....	47,717	119	107	2·49	2·24	4·73

It will be seen from this table that the rate for puerperal sepsis in 1935 was 2·49 as compared with 2·69 in 1934, and that the rate for other puerperal causes was 2·24 as compared with 3·30 for 1934, while the total rate for all causes was 4·73 as compared with 5·99 in 1934.

If, however, we take the figures over a period of five years, we find that for the years 1926-1930, inclusive, the rates were 2·43 for puerperal sepsis; 2·54 for other puerperal causes, or for all causes 4·97. During the period 1931-35, inclusive, the figures were 2·60 for puerperal sepsis; 2·50 for other puerperal causes, or for all causes 5·10. It will thus be seen that during the last five year period there has been a slight increase in the rate for puerperal sepsis and that the rate for other puerperal causes has practically remained stationary.



Further, it would seem that our rate from other puerperal causes is not much, if any, in excess of the world average for deaths from these causes. Our puerperal sepsis rate is definitely in excess of that for many countries and is responsible for the relatively high maternal death-rate of South Africa.

Puerperal sepsis, of course, in all countries leads to more deaths and more injury than any other single complication of child-bearing and it is one of the causes which it should be the most easy to prevent by observing antiseptic principles. The infection may be localised or general. It is usually due to the access of pathological organisms (most commonly a haemolytic streptococcus) to an unhealed wound surface in the generative tract at the time of a premature or full term labour or during the puerperium. The result of the introduction of infection depends not only on the virulence of the infecting agent but also on the general resistive power of the patient. While the source of infection is usually extrinsic there may be intrinsic infection from organisms present in the vagina, blood or elsewhere, or a true autogenous infection from a septic focus, for example, the teeth or tonsils in the woman's own body. It is even possible—as in a recent outbreak in the Transvaal—for infection to be caused by a healthy "carrier" who harbours haemolytic streptococci in, for example, the naso-pharynx.

It has recently been suggested by a member of the medical profession in a letter to the lay press that by encouraging unqualified midwives and by the passing of a law or regulation to provide that all midwives must attend a dozen lectures by the district surgeons and compelling them to carry out certain strict antiseptic precautions in their work with antiseptics and other necessaries provided free by the Government, the maternal death-rate in South Africa could be reduced immediately to about one death in 700 births, or 1·4 per 1,000.

As the maternal death-rate in South Africa for causes in which sepsis plays no part at all has been 2·50 per 1,000 over the last five years, and as the maternal death-rate from puerperal fever in other countries with the best midwifery services in the world seldom is less than 1 per 1,000, and is generally higher, it is a little difficult to follow the writer, unless he believes, as would seem to be the case, that by the term maternal death-rate is meant the maternal death-rate from puerperal fever alone.

But after thirty-three years experience of the unqualified midwife in all parts of South Africa, I am satisfied that by far the great majority of these women are incapable of receiving instruction of the kind suggested and until such persons can be driven out of the business and replaced by qualified persons, I am afraid that the maternal death-rate from sepsis will continue to be excessive. The minority of unqualified midwives who mostly belong to the younger generation are more receptive of instruction and at several centres, notably Durban, efforts have been made to provide the same on the lines suggested by the writer.

Our knowledge of the origin and spread of puerperal infection is still incomplete and inexact, and while this remains so, even with the best qualified help, we cannot hope to abolish puerperal fever entirely. It has not so far been accomplished by any State in the world, but the incidence of puerperal fever would at least be reduced by the employment of properly trained persons as midwives. Further research is needed to establish accurately the causation and to determine the best methods of prevention and treatment.

With the passing of Act No. 57 of 1935 a commencement has been made with the establishment of a nursing and maternity service which formerly only existed to a slight extent in some of the large towns. On this we must build until we have secured a complete maternity service which secures to every woman such assistance as is needed to ensure for her a safe journey through pregnancy, a well conducted labour with a minimum of danger to herself and her child and careful nursing and post-natal supervision. This cannot be provided without the generous provision of funds and without intensive organisation on a national scale.

Such knowledge as has been gained in this and other countries makes it clear that there is no one royal road or short cut to affecting a really substantial reduction in the maternal death-rate.

The problem of preventing avoidable death and damage due to child-bearing can only be solved by a simultaneous attack from various directions—administrative, educational, clinical, pathological and social. The reduction in the maternal death-rate must indeed be only one step in the steady progress that must be ensured for a higher standard of physical welfare for the people as a whole.

In Table P (iii) is included a table of European deaths classified under the different causes in the different age groups.

TABLE P (iii).

Causes.	EUROPEAN DEATHS FROM PUERPERAL CAUSES—1934. (ACCORDING TO AGE PERIODS.)							EUROPEAN DEATHS FROM PUERPERAL CAUSES—1935. (ACCORDING TO AGE PERIODS.)								
	All Ages.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45 and Over.	All Ages.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45 and Over.
Post Abortive Sepsis.....	30	1	3	10	9	5	1	1	23	1	4	7	5	6	—	—
Abortion—not returned as Septic.....	5	—	1	—	1	1	1	1	8	—	1	—	3	3	1	—
Ectopic Gestation.....	13	—	1	6	1	3	2	—	12	—	—	4	1	3	4	—
Other Accidents of Pregnancy.....	—	—	—	—	—	—	—	—	2	—	—	—	—	1	—	1
Puerperal Haemorrhage.....	40	—	8	11	10	5	6	—	22	3	4	4	4	3	2	2
Puerperal Sepsis.....	91	5	24	19	23	9	9	2	96	5	20	24	19	20	7	1
Puerperal Albuminuria and Convulsions.....	39	2	7	7	8	10	4	1	22	1	4	5	4	4	4	—
Other Toxaemias of Pregnancy.....	7	—	1	2	2	2	—	—	11	1	3	2	3	2	—	—
Puerperal Phlegmasia—Alba Dolens, Embolism and Sudden Death.....	9	—	—	1	1	6	1	—	8	—	1	1	3	1	2	—
Other Accidents of Childbirth.....	34	1	9	10	6	3	5	—	20	—	1	6	4	4	5	—
Other or Unspecified conditions of the Puerperal State.....	1	—	—	—	1	—	—	—	2	—	1	—	—	1	—	—
Puerperal Diseases of the Breast.....	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
TOTAL.....	269	9	54	66	62	44	29	5	226	11	39	53	46	48	25	4



7. *Need for Mothers' Clinics.*—In my last annual report I mentioned the fact that a few mothers' clinics had been established by voluntary organisations in some of the larger towns in the Union.

I am convinced that the time has arrived when these clinics should be multiplied under state guidance and assistance. The term "Birth Control Clinics" should be dropped as liable to cause misapprehension and the clinics should be called instead "Mothers' Clinics" and should form part and parcel of the maternity service of the country.

The work of such clinics should consist primarily in providing or arranging for the treatment of gynaecological conditions in women unable otherwise to secure proper advice and treatment, and secondarily in giving instruction in birth control methods to those who are temporarily or permanently medically unfit to bear children as well as to those who need advice for social welfare reasons in regard to the proper spacing of families.

8. *District Nursing.*—During the year ended June, 1936, a rapid development of the district nursing service has taken place.

At the time of the last annual report the work being done under this heading was mainly in the nature of a survey of nursing conditions throughout the Union, with particular reference to the rural districts and their more urgent needs. A great deal of propaganda work was carried out at the same time by the three nurse-lecturers attached to the Department, and, largely as a result of this work, there has been a heavy demand for assistance under the provisions of sections 13, 14 and 15 of Act No. 57 of 1935, which came into force on 1st July, 1935. During the first month or two after the promulgation of the Act, progress was slow, mainly on account of the amount of correspondence involved before outlying communities could be made thoroughly conversant with the details of the requirements of the law, and also owing to lack of precedent in the many different situations which arise in different places. The principal grants authorised at first were to societies such as the King Edward VII Order of Nurses, the "Afrikaanse Christelike Vroue Vereniging", and Child Welfare Societies, which had been employing nurses for some time prior to the coming into force of the Act, and to the Cape, Orange Free State and Natal Provincial Administrations in respect of district nursing services carried out through various hospital boards controlled by them.

Within a few months, however, many new applications were received and new appointments of district nurses, in accordance with the provisions of the Act, took place all through the country. A comparison of the figures given below, showing the numbers of nurses subsidised at the end of December, 1935, and at the end of June, 1936, illustrates the rapid growth of the movement.

	<i>As at 31.12.35.</i>	<i>As at 30.6.36.</i>
(a) Refund of one-third of salary of European nurses under section 14 (a) ... ..	23	37
Subsidies to European nurses under section 14 (b) ... ..	7	26
Subsidies to coloured nurses under section 14 (b) ... ..	1	2
	<hr/>	<hr/>
	31	65
(b) Refund of one-third of salary of native nurses under section 14 (a) ... ..	2	2
Refund of one-third of salary of native nurses and native nursing assistants under section 15 (a) ... ..	11	16
Subsidies to native nurses and native nursing assistants under section 15 (b) ... ..	3	7
	<hr/>	<hr/>
	16	25
	<hr/>	<hr/>
TOTAL ... ..	47	90
	<hr/>	<hr/>

A detailed consideration of the development under the separate sections of the Act is of interest.

*Section 13.*—At the end of June, 1936, subsidy was being paid to the provincial administration in respect of district nursing services established at six centres in the Cape Province, three in the Orange Free State and two in Natal.



In the Cape Province, most of the smaller hospital boards are willing to appoint district nurses or district midwives, but the existence of a Cape Provincial Ordinance (No. 25 of 1929) laying down a district nurse's salary at a scale obviously intended for a fully trained European nurse holding her general and midwifery certificates, makes it impossible for these boards to appoint a district midwife holding her midwifery certificate only, or to appoint a non-European nurse or midwife—unless the board is prepared to pay the salary of £215 a year laid down in the Ordinance. This is manifestly unreasonable, and is a real difficulty encountered in small towns, where the local community can only contribute a comparatively small sum to the hospital board in respect of a district nurse or midwife, certainly not enough to earn from the provincial administration the full salary of £215 per annum. In many instances a midwife is all that is required, and section 13 expressly allows for a "midwifery service". In other instances it is a native or coloured nurse or midwife that is required, and whose salary should be suitably graded.

Neither the Orange Free State nor Natal has an ordinance laying down the salary of a district nurse, nevertheless the appointment of district nurses under hospital boards has been slower in development in these provinces than in the Cape.

No district nurses have so far been appointed under hospital boards in the Transvaal, and it is to be hoped that in the near future the relative Transvaal Provincial Ordinance will be amended in order to allow of such appointments, as at present the Transvaal suffers by comparison in this matter with the other three provinces.

*Section 14.*—Many new appointments have been made under section 14 (a), but in far too many cases the Department has had to fall back on paying out subsidies to private nurses under 14 (b), which is not by any means the most satisfactory method of providing assistance. In places where there has never been a nurse, it is difficult to calculate how much she may earn by way of fees, and communities are afraid of undertaking to pay a nurse a definite salary, if they are uncertain how much will accrue to them from this source. The subsidies paid to private nurses and midwives under 14 (b) vary from £36 a year to £180 a year. It must be remembered that such subsidies are paid to enable a nurse to live in an area where she is needed. In some cases a small subsidy is being paid to a qualified woman who does a great deal of work among non-paying patients, but does it simply because she happens to be a trained nurse, married and living in an area where there is no other trained assistance, but who is in no way dependent on her subsidy for a livelihood. Such subsidies are paid as an acknowledgment of services and to cover running expenses in connection with the work. A nurse or midwife subsidised under section 14 (b) remains an independent worker in private practice, not under any special control, and the value of her services to the community as a whole depends entirely on herself. She is in a more difficult position than the full-time employee under section 14 (a), as she must often be faced with a choice between the non-paying and the paying patient, i.e. between her own financial interests and her sense of duty to the pauper patient.

It is hoped that in many cases after a nurse has been subsidised under section 14 (b) for a year or so, the fees she earns will justify her appointment on a full-time basis by some charitable organisation. In the meantime subsidies are being paid, rather than that a community should be left unaided for months, while ways and means of raising a salary are being debated.

The salaries paid under section 14 (a) to midwives, in particular, are unfortunately low in some cases, and there are places where the midwife concerned is certainly earning for her employing society a good deal more than they are paying her. This is not a fair policy, nor a wise one in view of the present great shortage of trained nurses and midwives, who will soon find that they can do better elsewhere.

*Section 15.*—Few native nurses are yet employed under section 15, but one or two in private practice are now receiving small subsidies under section 15 (b) to encourage them to practice as private midwives among their own people. They are not doing much work yet, as they have great difficulties to contend with in the form of superstition and witch doctors, but they are definitely making headway.

The native nurse as a rule needs fairly constant supervision, and the most satisfactory plan is to subsidise under section 15 (a) nurses employed under the supervision of missions or charitable associations.

9. *Supply of Nurses and Midwives.*—*Shortage of Nurses.*—The shortage of nurses is more acute than ever, mainly owing to the continued expansion of hospital services, but partly owing, no doubt, to the absorption into the district nursing service of those available and willing to enter it. The needs of the country, however, are greater than those of the town, and have



remained too long unheeded. There are at the moment vacancies for about 33 district nurses and though some of these could be filled to some extent by midwives, they would not meet the requirements in every instance.

*Supervision of Midwives.*—The nurse lecturers from the Department continue to tour the country, doing periodical inspections of nursing and maternity homes; following up, where possible, reported cases of puerperal sepsis; inaugurating new district nursing services, and inspecting and reporting upon the work of subsidised district nurses. They are now also, as much as possible, taking careful stock of local midwives, particularly the untrained. As a result, local authorities have been induced to weed out a certain number of the most undesirable. This work is being pressed on with and should cause a safer and better service for the community. In far too many instances still, no list of persons practising midwifery is kept, or if kept, is quite out of date and contains the names of those long since dead or who have left the district, or are permanently unfitted by age or infirmity to carry on the work. The decisive factor is the attitude of the local doctors who, in many instances, are not sufficiently interested in the standard of the midwifery work done in their areas; there is also an extraordinary degree of difference in standard in small towns of comparable size and population—a marked improvement being shown where there is an energetic and conscientious part-time medical officer of health or district surgeon.

10. *Nursing and Maternity Homes.*—(a) *Registrations.*—Nursing homes reported closed for the year ended 30th June, 1936, total 70, compared with 73 for the previous year. New registrations effected total 56 compared with 52 for the previous year. The net result is that for the year under review there are 316 establishments on the registers of the Department compared with 324 for the previous year.

Registrations effected during the past eight years are reflected in the accompanying Table Q (i).

TABLE Q (i).—NURSING HOMES REGISTERED WITH THE DEPARTMENT.

Year.	Cape.	Transvaal.	Natal.	Orange Free State.	Total.
1928-29.....	104	90	43	26	263
1929-30.....	124	91	54	29	298
1930-31.....	110	98	51	25	284
1931-32.....	95	94	44	26	259
1932-33.....	105	100	46	25	276
1933-34.....	115	103	43	28	289
1934-35.....	126	128	42	28	324
1935-36.....	120	116	46	34	316

The occupation of new buildings by some of the older establishments and the construction of entirely new premises for new nursing homes according to plans which have been approved by the Department, is a very satisfactory feature of the year's work. Instances have occurred where premises were inspected which were models of the very best and modern ideas of what a nursing home should be as regards accommodation for patients, staff quarters, service conveniences, sanitation, etc. This is gratifying as it heralds the gradual disappearance of the "adapted dwelling-house type" of home.

(b) *Inspections.*—These show a great advance over previous years and are due to the work done by the inspecting staff of the Department, especially that of the nurse lecturers. A more regular inspection of nursing establishments in the urban areas by the local medical officers of health seems highly desirable and has not been so well maintained during the past few years. The position is summarized in the accompanying Table Q (ii) where figures for the past four years are given.

TABLE Q (ii).—NURSING AND MATERNITY HOMES INSPECTED DURING THE YEARS ENDED 30TH JUNE, 1933, 1934, 1935 AND 1936. RESPECTIVELY.

Place.	Inspections.							
	By Medical Officer of Local Authority.				By Department and Other Government Officer.			
	1933.	1934.	1935.	1936.	1933.	1934.	1935.	1936.
<i>Cape Province.</i>								
Capetown.....	8	4	1	4	—	—	—	—
East London.....	—	—	2	4	—	—	3	—
Port Elizabeth.....	7	8	1	8	—	—	—	—
<i>Elsewhere</i> .....	2	9	2	—	—	5	49	34
<i>Natal Province.</i>								
Durban.....	1	—	19	—	—	—	—	—
Pietermaritzburg.....	1	1	3	—	—	—	—	—
<i>Elsewhere</i> .....	2	—	—	—	—	9	9	24
<i>Transvaal Province.</i>								
Johannesburg.....	2	1	35	2	—	—	—	—
Pretoria.....	1	—	11	5	—	—	—	—
<i>Elsewhere</i> .....	2	5	1	1	14	45	32	65
<i>Orange Free State.</i>								
Bloemfontein.....	—	1	—	—	—	—	—	—
<i>Elsewhere</i> .....	1	—	—	—	1	9	10	29
Union.....	27	29	75	24	15	68	103	152

Results of the intensive and regular inspection work done by the departmental inspecting staff have not been wanting, and it is gratifying to mention that the recommendations made for improvements regarding such matters as accommodation for patients and staff, ventilation, medical and sanitary services, repairs to structures, sometimes even at considerable expense to the owners concerned, have generally been carried out. These, naturally, mainly affect establishments in rural towns and areas where in many cases nursing home conditions were far from satisfactory. The general level of efficiency and of hygienic conceptions has, however, been considerably raised. There are still some less desirable homes scattered over the Union, mostly in parts where, for lack of better facilities and poor support, improvement is difficult.

Generally speaking the routine inspections during the past few years have resulted in a marked improvement in the standard of nursing homes.

As regards nursing homes in the larger urban communities, the Department always acts in close co-operation and consultation with the local authorities, whose medical officers of health furnish the Department with reports on the establishments within their areas of jurisdiction. From these reports it is evident that there is still a great need for a general improvement in buildings and administration of many of these nursing homes.

(c) *Statistical.*—As the departmental registers of nursing homes have been revised with a view to recording data of material importance in the activities of these establishments, it is hoped to include useful information, regarding accommodation for patients and personnel, maternity and general nursing services, etc., in the next annual report for the whole of the Union.

(d) *Bed Accommodation.*—Bed accommodation available in nursing homes, registered with the Department in terms of the regulations, is shown in Table Q (iii) below which includes figures for the years 1934 and 1935 for comparison.



TABLE Q (iii).—BED ACCOMMODATION AVAILABLE IN NURSING HOMES.

	1934.	1935.	1936.
<i>Cape Province—</i>			
Capetown and Peninsula.....	—	476	527
East London.....	—	56	59
Port Elizabeth.....	—	129	139
Queenstown.....	—	44	58
Stellenbosch.....	—	58	34
Rest of Province.....	—	349	340
TOTALS.....	1,064	1,112	1,157
<i>Transvaal Province—</i>			
Johannesburg.....	—	683	638
Rand Municipalities.....	—	238	248
Pretoria and District.....	—	125	142
Rest of Province.....	—	188	230
TOTALS.....	1,044	1,234	1,258
<i>Natal Province—</i>			
Durban.....	—	326	522
Pietermaritzburg.....	—	108	113
Rest of Province.....	—	603	454
TOTALS.....	1,044	1,037	1,099
<i>Orange Free State Province—</i>			
Bloemfontein.....	—	68	59
Rest of Province.....	—	123	151
TOTALS.....	180	191	210

11. *Mission Hospitals.*—During the year a tour of inspection of 36 mission hospitals doing nursing and medical work in Natal and Zululand was carried out.

In view of the present trend of opinion towards providing better facilities for the natives of the country, a summary of the conditions found on this tour may be of some interest.

The work of the mission hospitals, unfortunately, is often viewed with some distrust and disfavour by a certain section of medical men practising in the native territories. The missions are accused of using a bottle of medicine as bait to catch souls for their particular sect. It would be fairer to say that this medical work has been undertaken by the missionaries, who were pioneers in outlying places, because they found themselves, for humanitarian reasons, forced to do so and because nobody else undertook the responsibility. A vast amount of really good work has been, and is being, undertaken by many of the missions, and there can be little doubt but that missions undertaking medical work with qualified staff have done much to break down the power and influence of witch doctors in their respective areas.

*Medical Facilities.*—Of the 36 missions visited in Natal and Zululand there were resident qualified medical men at five, and one more mission hopes to obtain a resident medical woman in the near future. Those having doctors in the near vicinity who by arrangement pay regular visits numbered eleven. Four others receive occasional visits from the district surgeon, and fifteen are only visited in cases of emergency. Of these fifteen, most are cut off geographically from the doctor's aid. In only two instances did it appear evident that the mission did not want the doctor's co-operation, preferring to carry on the work quite unsupervised. For this same reason—fear of official interference and supervision—a good many have not registered as nursing homes with the department, although they undoubtedly charge what fees they can get from patients. Of the thirty-six missions visited, thirteen are registered with this department as nursing homes.

*Charges* for natives able to pay are usually at the rate of 1s. per out-patient, including medicine; 1s. to 2s. 6d. a day for in-patients, and £1 inclusive for a midwifery case. Food is sometimes provided by the patients themselves and sometimes by the missions.

*General Sanitation.*—Primitive conditions prevail in a great number of the "hospitals", but several have their own electric light and some have water-borne sewerage systems. Some are merely one-roomed clinics, from which a nurse—European or native—dispenses stock medicines and attends minor injuries. The bigger institutions have one or two rooms for the admission of maternity cases, and the biggest hospitals have large and small wards for the admission of all types of cases, men, women, and children.

District nursing among the kraals is carried out in a good many instances, but only two of the missions visited were employing district nurses on whose salary the department is refunding under section 15 (a)



of Act No. 57 of 1935. In the vast majority of cases the nurses who do the district work are also directly in charge of the mission hospital and therefore not eligible for subsidy.

*Staff.*—Most of the missions have qualified nurses in charge, but a great deal of difficulty is experienced in the registration of nurses by the various foreign missions concerned, owing to the certificates held by these nurses not being accepted by the South African Medical Board.

Among those visited were American, Anglican, Roman Catholic (French and German), Presbyterian, Swedish, Norwegian, Salvation Army, and Methodists.

In five instances the nurses in charge were found to have no qualifications at all, two of them being homoeopaths and dispensing and treating according to that teaching.

Native nurses are employed at thirteen hospitals, and at five there are native nurses only.

*Type of Work Undertaken.*—This varies from simple first-aid to those mission hospitals (three in number), where the nurses in charge examine, diagnose, prescribe, treat, dispense, and even operate.

Out of this list of 36 mission hospitals there are five which call for definite disapproval for one or other of the following reasons:—

- (1) Because they are badly run places kept in a dirty and insanitary condition.
- (2) Because they make no attempt to obtain medical help or co-operation.
- (3) Because they undertake a type of work which they are unqualified to do and unable to carry out properly.

There are a number of others where too much medical work is undertaken by the nurses, but where, also, this is due to isolation and a doctor would be welcomed if he came.

*Training Schools.*—Of the 36 missions visited—

Two train for the general and midwifery certificate of the South African Medical Council;

One trains for the general certificate of the South African Medical Council;

Two train nursing assistants.

12. *General Hospitals.*—The system of routine inspection on behalf of the Provincial Administration of the State-aided hospitals and kindred institutions in the Cape Province, Orange Free State, and the Transvaal was continued during the year. As in previous years, the public hospitals on the Reef and in Pretoria were inspected by the members of the Public Hospitals Advisory Council, while nineteen hospitals and aided charitable institutions were inspected and reported on by assistant health officers of this Department as opportunity arose. Owing to a shortage of professional officers, it was found impossible to inspect all the institutions in the three Provinces mentioned during the year under review, but the inspections are being systematically continued, and it is hoped that no institution will be left for too long without a routine inspection by an assistant health officer. The position of the State-aided hospitals in the Cape, Orange Free State, and Transvaal Provinces, exclusive of the purely State institutions and those receiving a fixed grant-in-aid annually, remains more or less the same as indicated in last year's Annual Report. It is satisfactory to note, however, that, generally speaking, there has been considerable activity throughout the Union in modernizing the existing hospitals and in carrying out extensions to meet the increased demands for hospital accommodation. The hospitals in Natal are State institutions, with the exception of one which is subsidised, and are not inspected by assistant health officers of this Department.

In the Cape Province the work on the superstructure of the new Central Hospital in Capetown is making satisfactory progress. The schemes for modernizing the hospitals in Kimberley and Queenstown did not make such rapid progress as was anticipated and the work is still in progress. During the year the Vryburg Hospital Board approached the Provincial Administration with a request for an entirely new hospital, and as the result of an inspection by an assistant health officer of this Department, it was recommended that either a new institution be erected or that the existing buildings be modernized and brought thoroughly up to date. A sketch-plan indicating the manner in which this service can be carried out and the estimated cost thereof was prepared for the Department by the Department of Public Works, but it is not known to what extent either of the schemes recommended has proceeded. The construction of two new hospitals, one at De Aar and one at Alice, was commenced. The former will provide accommodation for about 40 patients, while the latter is intended for about 8 European patients only. Plans for extensions to the hospitals in Paarl,



Worcester, Oudtshoorn, Middelburg, George, and Port Elizabeth were prepared and submitted to the Department for examination and report. The Port Elizabeth Hospital Board has also purchased the existing isolation hospital from the Municipal Council and the additional 72 beds so acquired will, it is understood, be available chiefly for paying and part-paying patients.

In the Transvaal Province a scheme to build an entirely new hospital on a more suitable site at Klerksdorp was approved, while plans for a similar scheme at Middelburg were prepared and submitted to the Department for examination and report. The schemes for new hospitals at Piet Retief and at Potgietersrust are proceeding. Plans for very extensive extensions to the hospitals at Heidelberg and Vereeniging were also submitted, but no decision on the matter is being arrived at pending further investigation as to the need of further hospital accommodation for these areas. Extensive additions to the hospitals at Johannesburg, Krugersdorp, Germiston, Boksburg, and Springs are in course of construction. The non-European patients in the Pietersburg Hospital are at present accommodated in old wood and iron buildings which are dilapidated and unsuitable. Plans for replacing these obsolete structures by brick buildings were prepared.

In the Orange Free State a new hospital was opened at Heilbron, while the new non-European section of the Harrismith Hospital was completed and brought into use. The scheme for the erection of a new maternity home in the grounds of the National Hospital at Bloemfontein has not yet been completed. Plans for additions to the nurses' home of the National Hospital were submitted for examination and report. The scheme for establishing a small hospital at Winburg appears to have made no further progress. During the year a commission to inquire into the management of the National Hospital was appointed by the Provincial Administration, and on request Dr. A. J. van der Spuy, an Assistant Health Officer of this Department, was detailed to serve on the commission. As the result of the commission's report, an amending ordinance affecting the National Hospital only was passed by the Provincial Council.

*Chronic Sick Hospitals.*—The scheme for the erection of the new chronic sick hospital near Capetown is making satisfactory progress. When completed this institution will provide accommodation for about 630 patients and will supply a long-felt want in the Province.

In the Transvaal the new chronic sick hospital at Rietfontein has reached an advanced stage and it is anticipated that the buildings will be ready for occupation within the next year. When completed, this institution will have accommodation for about 370 patients.

Up to the present no chronic sick hospital has been provided in the Orange Free State Province, though a few beds for chronic sick European patients are available in the Bloemfontein Municipal Isolation Hospital at Tempe. The need for accommodation for incurable cases in the Province is a very real one, and it is understood that the question as to the most suitable scheme is being investigated by the Provincial Administration.

The chronic sick hospital for Natal, situated at Hillcrest, near Durban, provides accommodation for approximately 100 patients.

13. *Administration of Habit-forming Drugs and Poison Regulations under the Medical, Dental and Pharmacy Act, No. 13 of 1928.*—The enforcement of the regulations regarding dagga, opium and other habit-forming drugs, as also the sale of poisons, has been strictly carried out. This is done by means of close co-operation between the Department, the Police, Commissioner of Customs and Excise and the Postmaster-General. The following table shows the prosecutions and convictions:—

TABLE R.—PROSECUTIONS AND CONVICTIONS UNDER LAWS RELATING TO HABIT-FORMING DRUGS DURING THE PERIOD 1ST JULY, 1935, TO 30TH JUNE, 1936.

Province.	European.		Native.		Asiatic.		Other Coloured.		Total.	
	Pro-se-cu-tions.	Con-vic-tions.	Pro-se-cu-tions.	Con-vic-tions.	Pro-se-cu-tions.	Con-vic-tions.	Pro-se-cu-tions.	Con-vic-tions.	Pro-se-cu-tions.	Con-vic-tions.
Cape.....	73	60	820	767	11	9	1,456	1,403	2,360	2,239
Natal.....	5	5	2,250	2,188	48	46	66	65	2,369	2,304
Transvaal.....	44	42	2,387	2,295	9	8	225	216	2,665	2,561
O.F.S.....	11	10	253	247	—	—	31	29	295	286
UNION.....	133	117	5,710	5,497	68	63	1,778	1,713	7,689	7,390



The total number of prosecutions in the Union amounted to 7,689, of which 7,686 were in respect of dagga and 3 on account of other habit-forming drugs.

10½ ounces of opium and large quantities of dagga were seized and destroyed.

The quantities of habit-forming drugs imported into the Union during the year ended the 30th June, 1936, were:—

Opium, raw, 696½ lb.; opium, medicinal, 227 lb. 4,082 grains; opium, in the form of tinctures, etc., 58 lb. 1,958 grains; coca leaves, 28 lb.; Indian hemp, 141 lb. 2,282 grains; morphine, 65 lb. 4,915 grains; heroin, 23 lb. 191 grains; cocaine, 37 lb. 5,933 grains.

The following habit-forming drugs were exported to the adjoining territories during the period under review:—

Raw opium, medicinal, 1 lb.; opium in the form of tinctures, etc., 26 lb. 3,261 grains; coca leaves, 2 ounces 125 grains; Indian hemp, 1 lb. 2,625 grains; morphine, 1 lb. 3,268 grains; heroin, 6 ounces 62 grains; cocaine, 1 lb. 786 grains.

In addition to the above exports 1,680 lb. of *Cannabis Indica* were exported to Great Britain by a specially licensed producer.

The question of prescribing a uniform register for recording transactions in habit-forming drugs in terms of section 65 (6) of Act No. 13 of 1928 has received attention, and the adoption of a form of register recommended by the South African Pharmacy Board has been decided on. In order to enforce the use of such register it may be necessary to amend the regulations dealing with habit-forming drugs, and this matter is now receiving attention.

Inspection of the habit-forming drug registers required to be maintained by chemists and druggists has been carried out by the Department's inspectors in conjunction with their duties in connection with the enforcement of the provisions of the Food, Drugs and Disinfectants Act, No. 13 of 1929. Where transgressions have occurred the parties concerned have been advised and a warning has generally proved sufficient to have any irregularities rectified.

In regard to the keeping of habit-forming drug registers by medical practitioners, dentists and veterinarians, the South African Medical Council has circularised the members of the two professions concerned who are under its jurisdiction bringing to their notice the requirements of Act No. 13 of 1928, as there still appear to be infringements in this connection and laxity in the issue of prescriptions for habit-forming drugs.

There are relatively few drug addicts in South Africa as compared with many other countries. The question of making provision for the compulsory detention in a mental hospital of persons who are drug addicts is under consideration by the Department of the Interior. This is a much needed innovation as it is very difficult to deal with a drug addict without powers of compulsory detention—the voluntary patient almost invariably leaving the institution as soon as his supply of drugs comes under regulation.

With a view to closer co-operation in combating the illicit traffic in narcotic drugs, the Government has decided to accede to the International Convention for Limiting the Manufacture and Regulating the Distribution of Narcotic Drugs, 1931. The Government's obligations under this Convention will entail stricter supervision and control in all branches of work in connection with narcotics as statistical returns have to be compiled with greater detail than previously.

On the 1st January, 1936, the amended Poisons Regulations published under Government Notice No. 1662 of 15th November, 1935, came into force, further restricting the supply of poisons and preparations containing poison by persons who have not had the necessary training for the proper care of poisons. As much confusion existed regarding the poisons which could be sold by others than a chemist and druggist, a list is included in the regulations of what may be sold by general dealers.

Inspectors of the Department continue to find infringements of the poison regulations in the course of inspections of poison registers required to be kept in terms of section 52 of Act No. 13 of 1928 by general dealers in possession of certificates to sell poisons. Warnings have been issued and in several cases prosecutions have been resorted to where infringements have continued after the parties concerned have been advised and warned.

It was brought to the notice of the Department that two deaths occurred amongst mine natives on the Crown Mines alleged to be due to taking "Witte Vomities" Powders, a "Dutch" medicine containing tartar emetic (Division I poison) and sold over the counter of mine trading stores. As the sale of a "Dutch" medicine containing a Division I poison by other than a chemist and druggist is a contravention of the Regulations, the matter was investigated by an inspector of the Department, who made a close search



of the mining stores in question, but failed to trace any "Witte Vomitif" stocked therein. The wholesale chemist who manufactured the preparation was also interrogated but no record could be traced of any sales thereof during recent months to mine trading stores. Beyond warning all concerned as to the requirements of the law, no further action was taken.

14. *Anaesthetics*.—The relatively heavy death rate in the Union in connection with the administration of anaesthetics during surgical operations has been a matter of investigation by the Department during recent years. Every death that occurred was carefully inquired into. In this way an amount of data sufficient to allow of statistical examination by an expert committee has become available. In all among a total of 203,159 surgical operations in the larger hospitals there had occurred 318 deaths, a ratio of 1.57 deaths per 1,000 operations.

The Committee appointed by the Minister to consider the data collected by the Department met under the Chairmanship of Dr. A. J. Orenstein, the other members consisting of two surgeons, Professor I. W. Brebner and Mr. J. J. Levin; two anaesthetists, Drs. F. B. Mudd and B. Weinbren; the Professor of Pharmacology of the Witwatersrand University, Professor J. M. Watt; with Dr. L. S. Robertson, Assistant Medical Officer, Rand Mutual Assurance Company as Secretary.

The Committee in a unanimous report considered itself justified in coming to conclusions which may be summarised as follows.

In about one-third of the cases where chloroform was administered, morphia was also given, a procedure which adds considerably to the risk. A large number of moribund cases are included in which death would in all probability have ensued regardless of the method of anaesthesia employed. In a number of cases, considering the condition of the patient, the anaesthetic was ill chosen, e.g. chloroform administered in septic and toxæmic cases. In many of the reports the recorded amount of anaesthetic used was so small that the Committee considers either, that the record is inaccurate, or death was unlikely to have been caused by the anaesthetic. In a number of records in which shock is given as the cause of death, the accuracy of the diagnosis is doubtful, having regard to the nature of the operation and the time factor. In a number of cases chloroform was injudiciously administered in a "closed" apparatus. In a number of cases, depressant drugs, such as morphia, were combined with avertin, or avertin combined with ethyl chloride, both dangerous procedures in inexperienced hands. As the administration of gas and oxygen in the hands of an experienced anaesthetist is almost free from danger, the number of deaths ascribed to gas and oxygen anaesthetics can only be explained by the fact that these were administered by inexperienced anaesthetists. In very few cases, if any, would it seem that oxygen was combined with inhalation anaesthesia. In a number of cases it is recorded that the patient had become cyanosed, which was probably due to mechanical obstruction to the entry of air. In general, it appeared to the Committee that the information given in the returns which were furnished by the Superintendents of the Hospitals was in a number of cases obviously inaccurate.

In considering the question as to what constitutes a death due to anaesthesia, the Committee decided to adopt the formula which has received general approval in Great Britain:—

"When a person in ordinary health dies while under the influence of an anaesthetic, either before operation has begun, or during, or after the performance of an operation, involving no severe shock or haemorrhage and provided no mechanical cause of death has arisen."

Applying this formula to the material examination, the Committee was of opinion that the true death rate in South Africa due to anaesthetics, for the period under review, was not 1.57 per 1,000 as mentioned above, but rather less. Using various procedures, including a study of the official Government Mortuary returns, the Committee came to the conclusion that in the Union of South Africa, deaths due solely to the administration of anaesthetics or in which the administration of anaesthetics was a contributory cause were approximately 0.93 per 1,000 operations.

This ratio is higher than in other parts of the world, and the Committee considers that it should be possible to reduce it considerably.

The following recommendations were submitted, which, if adopted, would in the opinion of the Committee tend to lower the mortality rate due to anaesthesia. It is, however, pointed out by the Committee that conditions in South Africa make it unavoidable that many operations are performed and anaesthetics administered by practitioners with relatively inadequate experience; it is, therefore, to be anticipated that the death rate will be higher here than in more densely populated countries:—

1. In all hospitals, nursing homes and similar institutions in every case in which an anaesthetic has to be administered, it shall be preceded by medical examination, including the taking of blood



pressure, with special reference to the induction of anaesthesia. These findings shall be recorded in writing and signed by the medical practitioner who carried out the examinations, and these notes shall be read and signed by the anaesthetist prior to the administration of the anaesthetic.

2. Special care shall be taken in the premedication of the patient with a view to avoiding the administration of drugs which will add to the danger of anaesthesia. A full record of premedication and pre-operative treatment shall be submitted to the anaesthetist together with the record mentioned in I hereof.
3. During the operation careful watch shall be kept on the state of the patient's breathing and the condition of the pulse. The routine use of an "air way" is strongly urged, and when used its efficiency should be closely watched.
4. The use of chloroform as an anaesthetic of choice is strongly deprecated.
5. Gas and oxygen is not a safe anaesthetic in inexperienced hands.
6. Premedication with morphia or barbiturates prior to avertin, or avertin followed by ethyl chloride or chloroform, increases the risk of anaesthesia.
7. The administration of oxygen with inhalation anaesthetics is strongly recommended. Oxygen and carbon dioxide in properly fitted cylinders should be available in all operating theatres.
8. The Committee invites attention to Moot's formula as a guide to the risk of the administration of anaesthetics:—

$$\frac{\text{Pulse pressure}}{\text{Diastolic pressure}} \times 100$$

If the result is more than 75 or less than 25 operation is a bad risk.

9. The importance of anaesthesia in modern medical practice is so great that the committee expressed the opinion that every reasonable facility should be provided to ensure that medical students and resident medical officers have every opportunity of acquiring adequate practical experience in the administration of anaesthetics. Furthermore, the committee considers it desirable that in hospitals, even those which are not associated with medical schools, specially trained anaesthetists should be employed and that it shall be part of their duty to impart instruction to the resident staff in the administration of anaesthetics.

Lastly the committee expressed a strong opinion that clause 86 of Act No. 13 of 1928 (Medical, Dental and Pharmacy Act), which reads as follows—

“The death of a person whilst under the influence of a general anaesthetic or local anaesthetic, or of which the administration of an anaesthetic has been a contributory cause, shall not be deemed to be a death from natural causes within the meaning of the Inquests Act, 1919 (Act No. 12 of 1919), or the Births, Marriages and Deaths Registration Act, 1923 (Act No. 17 of 1923), or any amendments of these Acts.”

operates unfairly to anaesthetists who are frequently called upon to anaesthetise moribund cases with the practical certainty of having to face a public inquest. The result is to create a state of mind in the anaesthetists which tends to endanger the safety of the patient by unduly hurrying the surgeon. The committee made a number of useful suggestions in regard to this matter which, after submission to the South African Medical Council and the Federal Council of the Medical Association of South Africa, will be taken up with the Law Advisers of the Government.



15. *Adulteration or False Description of Food, Drugs and other Articles.*—The following table reflects the administrative measures taken during the year under the Food, Drugs and Disinfectants Act, No. 13 of 1929:—

TABLE S.—SAMPLES TAKEN FOR EXAMINATION OR ANALYSIS UNDER ACT NO. 13 OF 1929, DURING THE YEAR ENDED 30TH JUNE, 1936, AND THE RESULTS.

Place.	Total Taken.	No. Analysed or Examined.	No. found Adulterated or Incorrectly or Falsely Described.	Prosecutions.	Convictions.	Remarks.
Ports of Union.....	145	139	25	—	—	Warnings re labelling and standards were issued in respect of 34 samples; 69 were detained pending re-labelling; 2 were destroyed.
Cape Province.....	1,568	1,552	202	105	87	—
Natal Province.....	578	577	70	44	34	—
Transvaal Province..	2,366	2,366	192	167	147	—
Orange Free State Province.....	307	307	23	21	17	—
TOTAL.....	4,964	4,941	512	337	285	

*Imported Articles dealt with at Union Ports (including Inland Customs Ports of Entry).*—This work is still being undertaken with the co-operation and assistance of the Department of Customs and Excise and of the 145 samples submitted for analysis or examination 41 came from Capetown, 31 from Johannesburg, 18 from Port Elizabeth, 15 from East London and 40 from Durban. Of these, 25 proved not up to standard, 34 warnings were issued on account of defective labelling or deficiency in standard, 65 consignments were released after re-labelling in customs and 2 were destroyed. The articles embraced cheese (46 samples), ghee (15 samples), coffee and drugs (12 samples each), malt extract (11 samples), disinfectants (10 samples), condensed milk and canned peas (7 samples each), milk powder (6 samples), cream and fats (5 samples each), flour (2 samples) and bakery products, cheese and celery, cocoa powder, egg yolk, ham, palm oil and cream preservative (1 sample each).

*Sampling by Local Authorities.*—Two fresh delegations in terms of section 2 (3) of the Act were made during the year, namely to the Town Councils of Walmer and Hercules, and the number of municipalities authorised to undertake the sampling in their areas of perishable articles as also flour, meal, bread and other articles not packed or sold in sealed packages now is 29, viz. 11 (Capetown, East London, Graaff-Reinet, Grahamstown, Kimberley, Kingwilliamstown, Paarl, Port Elizabeth, Queenstown, Uitenhage and Walmer) in the Cape Province; 14 (Benoni, Boksburg, Brakpan, Germiston, Hercules, Johannesburg, Krugersdorp, Nigel, Potchefstroom, Pretoria, Randfontein, Roodepoort-Maraisburg, Springs and Vereeniging) in the Transvaal; 2 (Bloemfontein and Kroonstad) in the Orange Free State; and 2 (Durban and Pietermaritzburg) in Natal. Under the arrangement in force each local authority is entitled to the examination or analysis, free of charge in a Government laboratory, of a number of samples annually calculated on the basis of four samples per thousand of the European population at the last census. During the year a total of 2,456 samples were taken by local authorities under the delegated powers mentioned (namely 758 in the Cape Province, 1,247 in the Transvaal, 356 in Natal and 95 in the Orange Free State) of which 283 were found to be adulterated. Proceedings were instituted in 206 cases resulting in 175 convictions and the imposition of fines amounting to £418. 17s. 6d. The more important articles analysed included 1,959 milks (175 adulterated), 105 ice-creams (43 adulterated), 87 sausage polonies, etc. (22 adulterated), 54 coffees and chicory, etc. (7 adulterated); 55 meat and fish preparations (19 adulterated), 19 breads (1 adulterated), 22 sugars (none adulterated), 5 butters (none adulterated), 32 meals and flour (none adulterated), 5 cheeses (3 adulterated), 12 peppers (none adulterated), 3 dried milks (2 adulterated) and 2 oils (none adulterated).

*Sampling by the Department.*—In addition to sampling carried out by four inspectors of the Department, two of whom are stationed in Capetown, one in Durban and one in Pretoria, purchases in smaller urban areas are carried out with the co-operation of the police and in Johannesburg with the assistance of the Council's inspectors as regards milks sampled on railway premises and such other articles as the Council does not itself deal with under the delegated powers mentioned in the preceding paragraph. Out of a



total of 2,363 samples submitted for analysis, 204 were found to be adulterated in respect of which 131 prosecutions were instituted and 110 convictions obtained. The fines imposed totalled £205. 12s. 6d. The more important articles analysed included:—

*Food Articles.*—Milks, 1,692 (88 adulterated); dried fruits, 50 (25 adulterated); fruit juices, cordials, etc., 106 (10 adulterated); meat and fish preparations, 112 (36 adulterated); coffees and chicory, 43 (2 adulterated); canned vegetables, 34 (1 adulterated); baking powder, 19 (7 adulterated); edible oils, 22 (none adulterated); flour and meal, 5 (1 adulterated); fats, oils, lard, etc., 10 (none adulterated); pepper, 8 (1 adulterated); honey, 5 (none adulterated); ice-creams, 13 (6 adulterated); aerated or mineral waters, 49 (2 adulterated); ginger, 3 (2 adulterated); jellies, 5 (none adulterated); condensed milk, 4 (none adulterated); jams, 7 (none adulterated); chutneys and sauces, 9 (none adulterated); peanut butter, 3 (none adulterated); custard powder, 4 (none adulterated); mustard oil, 7 (1 adulterated); colouring matter and preservatives, 4 (none adulterated); cocoa, 2 (none adulterated); etc.

*Soaps.*—18 soap samples were analysed and all found to be up to standard.

*Drugs and Medicines.*—11 samples of liquid paraffin were analysed, and of these 8 were found to be adulterated; and of 73 samples of other drugs and medicines taken, 11 were found to be below standard.

*Disinfectants.*—In addition to 10 taken by Customs, 37 samples of disinfectants were analysed, and of the latter 2 were not up to standard.

A case emphasising the necessity of millers having to observe the requirements of the law regarding the provision of efficient sieving and winnowing appliances in connection with their mills, is deserving of mention. As the result of a district surgeon suspecting belladonna poisoning in a patient who had eaten bread made from certain meal steps were taken to have a sample of the meal in question analysed and the analytical report disclosed the presence of Mydriatic alkaloids which are derived (amongst other sources) from belladonna and stramonium. The vendor was successfully prosecuted and the matter further followed up by the source of supply of the contaminated meal being traced, with the result that in 8 further bags mydriatic alkaloids were found to be present. All the contaminated meal was destroyed. It is obvious that the source of contamination was *Datura stramonium* (stinkblaar) the seeds of which had apparently become mixed with the grain during reaping.

Representations have been made to the Department regarding the manufacture by some concerns of edible oils alleged to be not fit for human consumption and the framing of a regulation dealing with the matter is engaging the Department's attention.

During the year further amendments to the Food and Drugs regulations were considered necessary. They are in respect of:

- (a) *Re-processed Dried Green Peas.*—The practice of re-processing dried peas and marketing them ostensibly as canned fresh peas was represented as being on the increase and the Department was urged to provide by regulation under the Act that canned re-processed dried peas be labelled as such to distinguish them from the canned freshly-picked pea.
- (b) *Vegetable Fat.*—Under the old regulation no obligation was imposed on the packer to label a hardened vegetable fat as such *unless such fat was intended for use instead of lard*, and the new regulation now requires *every* cooking fat of vegetable origin to be labelled as such without regard to the special directions in which it is intended to be used.
- (c) *Surgical Dressings.*—The amendment brings "surgical dressings" within the scope of the Act and the effect will be that these articles will now have to comply with the standards laid down in the B.P. Codex.

It is hoped, for easy reference, shortly to reprint in pamphlet form the Regulations, embodying all the various amendments that have been made since the commencement of the Act.

*General Warranties.*—No new warranties in terms of section 28 of the Act were registered and the total number now in force is 22.

*General.*—Inspection tours undertaken during the year by the Department's inspectors in connection with the enforcement of Act No. 13 of 1929 continued to reveal irregularities which necessitated the issue of numerous written warnings.



16. *Unsound Foodstuffs*.—The inspection and examination by port health officers of food articles imported into the Union continued, and numerous articles, including cakes, cheese, desiccated cocoanut, cooked hams, corned beef, currants, dates, ground almonds, condensed milk, oatmeal, salmon, sardines and sugar were condemned as unfit for human consumption.

The value of 108 cases of tinned foods, 34 bags of cereals, 200 cases of fruit and 11 cases of miscellaneous foods destroyed as unfit amounted to £260. 17s.

Inspectors of the Department on their inspection tours also dealt with tinned foodstuffs in country stores and such as were found to be blown or otherwise unfit for human consumption were, in collaboration with the Police, and with the consent of the owner, destroyed.

In towns and villages where there is a constituted local authority action in this regard is a responsibility resting on such authority.

17. *Agriculture and Health*.—The financial depression and, more particularly, the depression in the agricultural industry has rendered one very valuable service to humanity. It has been brought home to many countries that the health of the poorer sections of the community can be improved by the provision of better food, and that this will react beneficially on the farming industry by creating a larger internal market for its production. As it was happily phrased by Mr. Bruce, the Australian delegate, at the Assembly of the League of Nations last September, marrying agriculture and public health was necessary in the interests of the latter. He stressed the necessity for increasing the consumption of protective foods as a remedy both for malnutrition and the agricultural crisis; and of changing the incidence of state protective subsidies so that they should serve to increase consumption rather than to restrict production.

The tragedy of agricultural over-production in the presence of gross malnutrition among the bulk of the population is being enacted in South Africa perhaps to a greater extent than in most other countries. Here we have a large section of the white population and practically the whole of the Bantu population suffering from the physical effects of under nourishment while the agricultural industry languishes. Committees of inquiry into the poor white problem as a whole and into sections of it (as in the Knysna-George forest and the diamond diggings populations), have been shocked by the effects of malnutrition due to the inadequacy of protective foods in the diet of growing children. And yet our dairy-farmers, who produce such protective food, cannot find a sufficiently remunerative market for their produce. More than half of the adult males of the native territories are found to be physically unfit for work on the mines so that a vast importation of labour from outside our borders becomes necessary. There is not the least doubt that this physical unfitness of the natives is to be attributed directly to the inadequacy of the diet particularly of the children and adolescents. There is not infrequently inadequacy in quantity when the supply of mealie meal fails. There is almost continuously inadequacy in quality owing to the virtual absence in their diets of protective foods: dairy produce, eggs, meat, vegetables and fruit. For the inadequacy in quantity, there is surely no excuse when mealies and sugar are being exported at prices below the cost of production. For the shortage in protective foods there also appears to be little excuse when dairy-farmers have great difficulty in disposing of their produce at a profit, and fruit and vegetable production has to be deliberately curtailed.

The urgent necessity in South Africa for the marrying of agriculture and public health in the interests of the latter surely requires no further elaboration. The method of effectively bringing about this desired union is hardly for this department to suggest. It is reasonable, however, to point out that if the method of subsidy is used the subsidy should be applied not at the point of production of the food, but at the point of consumption. In other words, the object of the state assistance should be to expand demand and thereby *indirectly* to assist the farmer. There are various ways in which such a subsidy may be applied, e.g., grants made to retailers to allow of a corresponding reduction in price and the provision of free or cheap foodstuffs to necessitous children, as is already being done under the free-milk-for-school-children scheme.

If effective marriage of public health and agriculture occurs there will be two obvious results: a great improvement in the fitness of the population; a solution of the problems of agriculture by increasing the local demand of foodstuffs. The increased physical fitness resulting from better feeding, has become evident to every observer. Spectacular health improvements have resulted from improved diets in many countries. In South Africa we can point to the increased fitness resulting from good rations among natives recruited for mining on the Witwatersrand, and among the youths enlisting in the Special Service Battalion. Milk added to the diet of school children has resulted in increased weight and height. Many of the disabilities and dangers associated with pregnancy and childbirth are removed by providing



a plentitude of protective foods. Improved nutrition also removes the very prevalent condition of sub-health which not only predisposes a large proportion of our population to gross ill-health but also keeps them chronically incapacitated from contributing their fair share of work to the State.

Though malnourishment and the ill-health and sub-health resulting therefrom is admittedly due primarily to economic causes, which can be remedied by either improving the economic status of the poorer sections or rendering the protective foods more available to them by subsidy or other State measure, an important factor which must not be overlooked is lack of dietetic information. The protective foods are almost invariably the most expensive and, therefore, the poor have to resort to the cheap starch foods. Nevertheless, protective foods are often not used because their importance is not appreciated. Many indigenous or substances easily grown in South Africa have been found to be rich in vitamins. In this connection the South African Institute for Medical Research is engaged upon a most useful investigation. Its Biochemical Department has for some years been examining the anti-scorbutic value of local foodstuffs and already Dr. F. W. Fox has been able to publish some very interesting findings. He reports that in general the foods eaten by Bantus in their own homes, either by choice or by necessity are of low anti-scorbutic value. Marked exceptions are certain fruits, such as the marula, from which also a highly anti-scorbutic beer is prepared, and the wild spinaches. Some of these native spinaches such as pigweed, black-jack, brotho, pumpkin shoots, bean shoots and cowpea shoots in addition to being excellent anti-scorbutics were found also to have other valuable protective properties, such as their high vitamin A and mineral salt contents. A good deal of information of this sort is already available. It should be widely published so that it may be utilised for improving health inexpensively.

One of the most obvious effects of the inadequacy of protective foods in South Africa is believed to be the serious dental deterioration taking place among large sections of the juvenile population. In a striking report by the Port Elizabeth and Districts Dental Society attention is drawn to the appallingly unhygienic condition of the mouths of children who attend the clinics conducted by it. The report states that it is the unanimous opinion of the members of the Society that immediate steps must be taken to obtain adequate nourishment for these children lest the strenuous work they were providing voluntarily became completely abortive. The vast majority of teeth already removed were permanent teeth and an alarmingly large proportion of the children will be rendered completely edentulous before they have passed out of their teens. In many cases where conservative work has been done, it has been found that after a few months the teeth literally dissolved away leaving the fillings adhering to mere skeletons of the crowns of the teeth and necessitating immediate extraction. The report goes on to state that:—

“ After over nine years' work at the Child Welfare clinics and over two years at the school clinics, this society has been driven to the following conclusions:—

That it is utterly futile to attempt conservation of the teeth, when such work is being constantly undermined by the chronic malnutrition and semi-starvation from which these 15,000 and more indigents are suffering.

That there can be no sound reason why so large a proportion of our citizens should continue to remain in a state of chronic malnutrition and semi-starvation when an abundance of the very foods so necessary to keep them in reasonable health is either being wasted on every side or exported.

That irreparable damage is being done to the constitution of these thousands of indigent children, during the most critical period of their lives; which damage must inevitably render them permanently unfit and eventually burdens upon the State ”.

This terrible indictment which could be repeated in many cases cannot be disregarded.

18. *Need for Dental Clinics and Dental Research.*—Much good work has been done at the various dental clinics organised by the South African Dental Association in some of the large towns of the Union. There is an urgent demand in the interests of health for the extension of such clinics throughout the country. But there is also a clear need for dental research in South Africa. There is, of course, evidence for the assumption that dental decay is due to defective diet and caused by the consumption of denatured foods such as white flour and sugars and combinations of these substances. There are some who believe that dental decay is due to a phosphorous deficiency in the diet. South African soils are, of course, often deficient in this mineral which plays such an important part in the formation of bones and teeth. There seems to be some reason to believe that dental decay is



more prevalent in phosphorous deficient areas than in areas which are not so deficient, but no real investigation has as far as I am aware ever been undertaken in South Africa to arrive at the truth.

I think that the time has arrived when the appointment of a specialist dental officer in the department would be justified. He would be enabled to carry out, in conjunction with groups of practising dentists and in association with medical officers in the Department and with experts in the South African Institute for Medical Research and in the Onderstepoort Veterinary Laboratory, a number of investigations which are very urgently needed in South Africa, besides acting as the co-ordinating link in the establishment of any dental health service that may be decided upon in the future.

19. *Prevention of Cancer.*—The National Cancer Association of South Africa has continued to carry out very valuable propaganda work. An account of the very useful work it is doing was given in my last annual report. This Department is represented on the Council of the Association along with other Government and Provincial Administration representatives. The Association is dependent for its revenue largely upon donations and the subscriptions of its members. This Department has assisted by collaboration in the preparation as well as in bearing the cost of printing of a pamphlet entitled "Truth about Cancer", which has been very widely distributed. It also bears the cost of a quarterly questionnaire which is sent to all medical practitioners, hospitals and nursing homes, with a view to collecting statistics.

The results of this inquiry have been analysed by Dr. M. J. A. des Ligneris, of the South African Institute for Medical Research, a member of the Statistical Committee of the National Cancer Association. From his analysis he has been able to draw interesting conclusions. These are being presented in the form of two papers to be read at the International Cancer Congress to be held at Brussels in September, 1936.

20. *Solar Radiation Survey.*—The ultra-violet rays of the sun have recognised physiological effects on the human being. These rays behave like a drug in that excessive doses have harmful effects whereas in regulated doses they are of real therapeutic value in the treatment of tuberculosis and certain other diseases. The harmful effects that may be produced are various. In diseased conditions too big a dose may have the exact opposite effect to that intended, and aggravation of the symptoms may result. Further, evidence is accumulating that even in the normal healthy individual excessive exposure to rays of the sun rich in ultra-violet radiation, may result in grave harm.

Thus the relatively very high proportion of skin cancers among Europeans in the Union compared with other forms of cancer is most probably to be attributed to our large amount of sunshine. We share with Australia, also a country of sunshine, the misfortune of a greater incidence of skin cancers than European countries. The probable adverse effect of our excessive sunshine is further supported by the large difference between the occurrence of skin cancers in males and females. According to statistics so far collected for Europeans in the Union the incidence of skin cancer in males is three times as great as in females. This is to be correlated with the fact that the women who are now at the ages in which cancer is likely to occur passed their youth in a period of greater protection from the elements as compared with their brothers. Further, females have in general always been somewhat careful of exposure of the skin to the sun. It is probable that skin cancer incidence among females will tend to approximate that among males with the more general adoption of outdoor sport by the hitherto gentler sex.

Another interesting pathological observation in South Africa is the unusually high degree of calcification of arteries among Europeans. We know that the action of ultra-violet rays is to cause the change of ergosterol in the skin into vitamin D. This vitamin controls the calcium-phosphorus metabolism of our bodies. While this action is up to a point thoroughly desirable in that the infantile disease of rickets is prevented and adequate laying down of bone and dental material is brought about, yet it must not be overdone. Too great activity may result in deposition of lime at undesirable points such as in arteries.

These matters are mentioned to indicate how necessary it is for an exact analysis of South African sunlight to be made. On the one hand the physician wishes to know the ultra-violet content of our sunlight at various times, seasons and places so that he can make therapeutic use of these healing rays. On the other hand research is necessary in the interests of general health as to what constitutes excessive exposure so that the public may be suitably warned against the danger of skin cancers, arterio-sclerosis and possibly other diseases.



For these reasons the Department seized the opportunity offered last year when one of the members of the scientific staff of the Institute of Physical Therapeutics of Jena University, Germany, was making observations in Kenya. This worker, Miss Riemerschmid, had been sent by the Jena Institute to East Africa to continue a general survey of sun radiation which she had already carried out in various other regions such as Davos in Switzerland, Brazil, Assouan in Upper Egypt and on the Atlantic. On the invitation of the Union Government, Miss Riemerschmid also came to the Union and made observations at Durban near the site of the Tuberculosis Hospital now in process of erection, and at the Nelspoort Tuberculosis Sanatorium. She also took readings on behalf of the Witwatersrand University at Johannesburg, and in South West Africa.

In Durban the measurements were taken from 15th June until 15th August, 1935, and at Nelspoort Sanatorium from 14th January until 22nd February, 1936. These periods were obviously much too short to allow of the findings being of therapeutic value. A complete year's survey, as is now in prospect, is necessary for this. Nevertheless the observations proved most interesting. Graphs were prepared to allow of comparison with Davos, the famous health resort in Switzerland for the treatment of tuberculosis.

It is important to realise that the measurements in Durban were made in winter, when the sun at noon reaches a height of  $35^{\circ}$ . At the corresponding time (midwinter) in Davos the sun reaches an altitude of only  $20^{\circ}$ . (The same height of the sun means an equal thickness of the atmospheric layer to be penetrated in both places.) With regard to the height of the sun, when this is the same in both places, the intensity of solar radiation is markedly lower in Durban than in Davos owing to the clearness of the atmosphere above the Alps during winter. Thus at  $20^{\circ}$  in winter in both places, the intensity is 1.34 gram calories at Davos, while only 1.09 gram calories in Durban. The total amount of radiation during a day is greater in Durban (winter) than in Davos (winter) as can be expected on account of the shorter days in the latter. Comparing Durban in June (winter) with Davos in June (summer) we find that the intensity of the solar radiation in Durban is about the same as in Davos, but only up to  $35^{\circ}$  sun height. In Durban in June (midwinter) the sun rises earlier than in Davos in December (midwinter), so that at 8 o'clock, for instance, the intensity is already 0.9 gram calories in Durban whilst at that time of the day the sun in Davos just rises, showing an intensity of 0.3 gram calories only. At 9 o'clock the difference has become very much smaller and at noon the intensity in Davos (December) is superior to the intensity in Durban (June-August). The comparison of the intensity of the radiation in relation to the hours of the day is very striking when Durban winter and Davos summer are contrasted. The total amount of the radiation during a day is very much greater in Davos owing to the very early sunrise and late sunset; besides that, the intensity during the whole of the day is remarkably higher.

The measurements at Nelspoort Sanatorium were carried out in *summer*. The intensity of the radiation proved to be remarkably high. In relation to the height of the sun it was found that the intensity was very much greater in Nelspoort than under the same conditions in Davos, that is to say, at the same height of the sun in both places. Even from the present data it may be concluded that the atmosphere in the Karroo is of rare clearness. In addition to this, the sun in midsummer in Nelspoort reaches a height of  $82^{\circ}$  and the intensity is increased still more. In relation to the hours of the day it was demonstrated that from 6 a.m. till 6 p.m. the average intensity was 10 per cent. higher in Nelspoort than in Davos. Only in the early morning and late afternoon was Davos superior, owing to the earlier sunrise and later sunset.

The intensity of the *ultra-violet part* of the radiation was measured by means of a so-called ultra-violet dosimeter. The instrument gives the intensity in relative units. The sensitivity of the instrument to ultra-violet rays is very similar to that of human skin, the maximum of sensitivity for both being at a wavelength of 2,970 Angstrom Units (for human skin according to the erythema curve). Durban in winter showed a very small intensity of ultra-violet radiation compared with Nelspoort in summer. But it was impossible to draw any conclusions about the atmospheric conditions, as sun height and length of the days are completely different in the two months compared.

The *total amount* of solar radiation on a horizontal surface for one month in Durban (winter, 3rd of July till 2nd of August, 1935) registered on a graph, was found to be 8,271 gram/cal/mim/cm. The amount for Nelspoort (summer, 18th of January till 17th of February, 1936) was 22,448 gram/cal/mim/cm. These figures are also not comparable, on account of the different circumstances (summer and winter) under which they were measured, but they are of interest in themselves.



Miss Riemerschmid's observations although carried out on too small a scale to allow of their utilisation in therapeutics have yet served to emphasize the necessity for a complete sunlight survey in South Africa. Such a survey has now been made possible by the munificence of Dr. Hans Merensky. He has undertaken to finance observations being made for a period of a full calendar year at various points in the Union. For this purpose it is proposed that Miss Riemerschmid spends the year 1937 in the Union. She will make her headquarters in Johannesburg, establishing the main observation station at the Rietfontein Tuberculosis Hospital for Natives. Further, five sub-stations will be equipped at Nelspoort, Bloemfontein, Roberts' Heights, Durban and Caledon. In this way the various types of climate in the Union will be included. The survey will be conducted under the supervision of this Department but the cost will be borne by Dr. Merensky.

21. *Spider Bite*.—Whilst it has long been suspected that certain spiders, found particularly in the Cape Province, possess a powerful venom, no systematic work on this problem was carried out in the Union till 1935 when Dr. M. H. Finlayson of the Biological Control Laboratories, Capetown, published a paper on "Knoppie Spider" bite. The results of this investigation showed that two venomous spiders of the *Genus Latrodectus* exist in the Cape Province; one, *Latrodectus indistinctus*, being confined in a comparatively limited area, the other, *Latrodectus concinnus*, being more widely distributed. It was estimated that an adult female *Latrodectus indistinctus* possessed sufficient venom to kill two hundred mice, and it is obvious therefore that this spider is highly venomous. *Latrodectus concinnus*, whilst less venomous than *Latrodectus indistinctus*, also possesses a potent venom. Antivenenes to these spider venoms have been prepared and it has been found that the antivenene to *Latrodectus indistinctus* venom neutralises both the venoms of *Latrodectus indistinctus* and *Latrodectus concinnus*. Stocks of antivenene for therapeutic purposes are being prepared at the Union Health Department, Capetown, and it is hoped that the serum will be available for issue at an early date. The majority of cases of spider-bite in the Cape Province occur during the grain-harvesting season in the grain areas where *Latrodectus indistinctus* abounds. Physicians in areas where these spiders are found who wish to obtain samples of spider antivenene may do so, free of charge, on application to the Union Health Department, Capetown.

22. *National Health Insurance*.—During the year a Committee of Enquiry was appointed to inquire into and report upon the practicability of the introduction in South Africa of a scheme of national health insurance. Its terms of reference were:—

To consider and report upon the practicability of the introduction in South Africa of a scheme of national health insurance for the purpose of providing adequate medical advice and assistance to any section of the population for which at present inadequate provision is made, and if such introduction be deemed to be practicable, to make recommendations as to the details of such a scheme, including the benefits to be provided and the nature of the arrangements to be made with members of the medical and pharmaceutical professions—

The Committee to give consideration in this connection, *inter alia*, to the report and evidence bearing on this subject of the Commission on Old Age Pensions and National Health Insurance (1927-28); and, further, to make such recommendations as it may think fit with a view to improving the system of medical assistance to any section of the people, where it considers that the needs of such section are not adequately provided for by any system at present in force or are not likely to be adequately provided for along the lines of policy already initiated and cannot be satisfactorily met by the scheme of national health insurance (if any) recommended by it.

At the end of the period under review the Committee had completed the taking of evidence and was writing the report. It has since been handed in and is at present under the consideration of the Government.

## VII.—CONCLUSION.

The department has, as usual, again drawn freely during the year on the resources of the South African Institute for Medical Research which the Director has always placed at its disposal. The thanks of the department are again due to the Board of the Institute and to the Director and his staff for their ever ready co-operation and assistance in connection with all questions affecting the public health.

The South African Medical Council and the South African Pharmacy Board have continued to render material assistance to the department and my thanks are due to the presidents and members of these bodies and to Mr. E. Herbert, the Registrar, for the manner in which they have co-operated with the department. Résumés of the work done during the year by these two bodies appear in Annexures F and G.

During the period covered by this report there have been frequent consultations with the Federal Council and on local questions with various branches of the Medical Association of South Africa, and my thanks are due to the presidents and members of these bodies for their cordial co-operation in the discussion of the problems submitted to them.

The department has also drawn freely on the advice of Dr. P. J. du Toit and Dr. G. de Kock, the Director and Deputy Director of Veterinary Services, on matters affecting the two departments, and my sincere thanks are due to these two officers for assistance freely and generously furnished.

Municipal medical officers of health have freely co-operated with the department and I am greatly indebted to these officials for their kindly help and assistance which have been at all times freely at the disposal of the department.

I am also greatly indebted to the Chamber of Mines for the co-operation of that body in connection with the holding of the Pan African Health Conference, and to Dr. A. J. Orenstein, C.M.G., chief medical officer to the Rand Mines, Limited, for his assistance at that congress, and for his advice and assistance in connection with mining and many other health problems.

During the period under review I was seconded for two months to act as a member of a commission appointed by his Honour the Administrator of the Transvaal Province to inquire into the working of the Native Affairs and Public Health Departments of the Johannesburg Municipality. For three months at the end of the year I was absent on leave from the Union. I cannot conclude this report without a reference to the services rendered by Dr. F. C. Willmot, Senior Assistant Health Officer, who acted for me as Secretary for Public Health in my absence, and by Mr. A. de V. Brunt, the Under Secretary for Public Health. Indeed the services rendered by the officers of the department, professional, administrative and clerical have been of the highest quality, and have been given without stint.

I am also again indebted to Dr. E. H. Cluver, Senior Assistant Health Officer at headquarters for having prepared much of the material contained in this report.

I have the honour to be,

Sir,

Your obedient servant,

E. N. THORNTON,

Secretary for Public Health and Chief Health Officer.

Department of Public Health,

Pretoria, 15th October, 1936.





## ANNEXURE A.

## CHART OF DEPARTMENT OF PUBLIC HEALTH as at 30th June, 1936.

Minister (Chairman),  
Secretary and Chief Health Officer (Deputy Chairman),  
Director of Veterinary Services.  
Mrs. S. B. Broers.  
Messrs. W. J. O'Brien, M.P., and L. C. Serrurier.  
Drs. K. Bremer, M.P., A. J. Orenstein, C. P. Theron, and  
Sir Spencer Lister.

Minister of Public Health (HON. J. H. HOFMEYR).

Council of Public Health

Leprosy Advisory Committee

Secretary and Chief Health Officer (Chairman),  
Sir Spencer Lister.  
Professors A. W. Falconer and W. H. Craib.  
Drs. A. Pijper, F. C. Willmot, G. W. Robertson A. J. Orenstein, K. Bremer, M.P., and G. A. Park Ross.

Secretary and Chief Health Officer (Sir E. N. Thornton).

Under Secretary (A. DE V. BRUNT).

Departmental Chief Clerk (A. Stuart).

1 Senior Assistant Health Officer  
(Dr. E. H. Cluver).†

1 Accountant (L. J. Hatch).

1 Chief Clerk Gr. II.  
(R. S. Gordon),

2 Principal Clerks.  
(P. I. Phelan and N. A. G. Reeler).

3 Senior Clerks.  
40 Clerks, Typists, etc.

## Sections.

Assistant Health Officers (Detached).	Inspection and Field Staff.	Maternity and Child Welfare.	Pathological and Biological Control Laboratories.	Port Health Officers.	District Surgeons.	Housing.	Leprosy Institutions.	Veneral Diseases Hospitals.	Malaria.	Tuberculosis.	Epidemic and Infectious Diseases (Plague, Typhus, Smallpox, etc.), and Vaccination.	Food and Drugs Adulteration; Habit-forming Drugs.	Local Authorities.	Other Bodies.
Capetown : (Drs. F. C. Willmot and P. Allan). Durban : (Dr. G. A. Park Ross and Dr. F. W. P. Cluver). Johannesburg : (Dr. L. Fourie).	Two Assistant Health Officers : (Drs. A. J. van der Spuy and H. S. Gear). Five Inspectors (4 plague and 1 typhus).	Medical Inspector (Dr. E. Drennan). Nurse Lecturers.	Capetown, and Vaccine Institute, Rosebank : (Drs. W. F. Rhodes, R. Turner, C. A. M. Murray). Capetown Biological Control Laboratory : (Dr. M. H. Finlayson). Durban : (Dr. B. Sampson). *South African Institute for Medical Research, Johannesburg.	Capetown : (Dr. J. M. Bosman). Durban : (Dr. G. A. Batchelor). Port Elizabeth : (Dr. H. W. A. Kay). East London : (Dr. E. V. S. Stevenson). Simonstown : (Dr. A. B. Bull). Knysna : (Dr. J. D. Allen). Mossel Bay : (Dr. F. T. Waldron). Port St. Johns : (Dr. G. H. Mciring).	15 Whole-time. 3 Whole-time. 339 Part-time. — 357 Total.	Central Board— Mr. R. S. Gordon (Chairman), Messrs. F. W. Jameson, J. L. Hall, P. U. Rissik and Dr. E. H. Cluver.	Pretoria : (Drs. J. H. Loots, H. v. R. Mostert, H. J. F. Wood, and F. A. Thornton). Emjanyana : (J. A. Macdonald, and Dr. A. R. Davison). Mkambati : (H. C. Bellow and Dr. F. S. Drewe). Amatikulu : (F. J. Roach and Dr. G. D. Stoute). Bochem : (J. H. Franz and Dr. P. B. v. d. Lith).	Rietfontein, Johannesburg : (Dr. J. Daneel). Kingwilliamstown : *Bochem. *Elim. *Jane Furse Memorial. Several smaller hospitals.	Transvaal : Medical Inspector : (Dr. D. H. S. Annecke). Inspectors and Assistants.  Natal : Medical Officer. (Dr. A. L. Ferguson). Inspectors.	Nelspoort Sanatorium : (Drs. B. A. Dormer and H. Ackermann). *Holy Cross Medical Mission.	Field Staff. District Surgeons. Local Authorities. Magistrates, etc.	Inspectors, Customs, etc. Chemical work done in chemical laboratories of Department of Agriculture at Capetown & Johannesburg. Pharmacist.	234 Municipalities. 101 Village Management Boards. 37 Local Boards. 29 Village Councils. 56 Health Committees. 8 Local Administration and Health Boards. 95 Divisional Councils. 1 Health Board. 152 Magistrates. 5 Mining Commissioners. — 718 Total.	South African Medical Council, South African Pharmacy Board, Rand Water Board.

\* Receives Grant-in-Aid.

† Is also Director of Medical Services (Defence).





## ANNEXURE B.

*Pamphlets and Leaflets published by Department of Public Health :—*

- “ Seneio Disease.” (Warning Notice.) No. 166 (Health).  
 “ Food and Health.” No. 194 (Health).  
 “ Anthrax.” No. 239 (Health).  
 “ Venereal Diseases: Their Prevention and Treatment.” No. 248 (Health).  
 “ Instructions to Persons suffering from Gonorrhoea.” No. 249 (Health).  
 “ Instructions to Persons suffering from Syphilis.” No. 250 (Health).  
 “ Instructions to Native Patients suffering from Syphilis or Gonorrhoea.” (In Zulu, Sixosa, Sesutu, and Sechuana.) No. 358 (Health).  
 “ Poisoning by ‘ Stinkblaar ’ or Thorn Apple (*Datura stramonium* and *Datura tatula*.)” (Warning Notice.) No. 256 (Health).  
 “ Smallpox: Duties and Powers of Local Authorities under Public Health Act, and procedure to be followed in dealing with outbreaks.” No. 276 (Health).  
 “ Directions for the Performance of Public Vaccination.” No. 279 (Health).  
 “ Dagga Smoking and its Evils.” No. 289 (Health).  
 “ Plague: A Brief Account of its Symptoms, Clinical Diagnosis, Morbid Anatomy and Treatment.” (Drs. D. C. Rees and J. A. Mitchell.) No. 293 (Health).  
 “ Plague: Its Control, Eradication and Prevention.” No. 316 (Health).  
 “ Plague Prevention and Rodent Destruction.” No. 317 (Health).  
 “ Plague Danger in Cape and South-Western Districts: Measures and Procedure in Event of Outbreak.” No. 380 (Health).  
 “ Rodents: Description, Habits, and Methods of Destruction.” (W. Powell.) No. 321 (Health).  
 “ Fly-proof Latrines for Coloured Persons.” ( Dr. G. A. Park Ross.) No. 334 (Health).  
 “ Houseflies: Their Life-history, Destruction and Prevention, and their Influence on Health.” No. 335 (Health).  
 “ Bilharzia (Human Redwater) Disease.” No. 339 (Health).  
 “ Snake-bite and its Treatment.” No. 348 (Health).  
 “ Influenza.” No. 363 (Health).  
 “ Typhoid or Enteric Fever: Its Causes, Spread and Prevention in South Africa.” No. 365 (Health).  
 “ Catechism about Typhoid or Enteric Fever.” No. 378 (Health).  
 “ Care of the Teeth and Prevention of Dental Disease in Children.” No. 368 (Health).  
 “ The Teeth: How to Prevent Decay.” No. 379 (Health).  
 “ Leprosy in the Transkei.” No. 372 (Health).  
 “ The Cause and Prevention of Simple Goitre.” No. 394 (Health).  
 “ Typhus or Louse Fever.” No. 417 (Health).  
 “ Typhus Catechism.” (In Zulu, Sixosa, Sesuto, and Sechuana.) No. 488 (Health).  
 “ Consumption, its Causes, Prevention and Treatment.” No. 439 (Health).  
 “ Malaria Catechism for use in Schools.” No. 360 (Health).  
 “ Life History of the Malaria Parasite.” No. 464 (Health).  
 “ Directions for the Prevention and Treatment of Malaria and Blackwater Fever.” No. 198 (Health).  
 “ Malaria Control by Anti-Mosquito (Adult) Measures.” No. 465 (Health).  
 “ The Control of Malaria by Larvicidal Methods.” No. 435 (Health).  
 “ Truths about Cancer.” (Published jointly with the National Cancer Association of South Africa.) No. 473 (Health).  
 “ Rabies.” (Published jointly with the Director of Veterinary Services, Department of Agriculture and Forestry.) No. 501 (Health).  
 “ Motherhood.” No. 482 (Health).



## ANNEXURE C.

PORTS OF THE UNION: HEALTH MEASURES DURING THE YEAR ENDED 30TH JUNE, 1936.

Particulars.	Capetown.	Durban.	Port Elizabeth.	East London.	Mossel Bay.	Knysna.	Port St. Johns.	Simonstown.	Port Nolloth.	Total.
Vessels dealt with.....	1,393	1,836	877	718	275	16	15	56	81	5,267
Cases of infectious or communicable diseases dealt with.....	181	376	12	15	—	—	—	—	—	584
No. of Vessels involved.....	101	181	3	4	—	—	—	—	—	289
Disinfections—										
Vessels.....	29	25	2	1	—	—	—	—	—	57
Consignments of second-hand clothing and other articles.....	2	35*	9	—	—	—	—	—	—	46
Deratizations under International Sanitary Convention—										
No. of Vessels Deratized and Certificates Issued	—	73	—	—	—	—	—	—	—	73
No. of Exemption Certificates Issued.....	13	77	—	—	—	—	—	—	—	90
Rats Destroyed on Vessels and in Dock Area.....	2,632	930	1,192	726	854	—	—	—	—	6,334

\* In addition, the personal effects of 1,574 Indian passengers were disinfected.

## ANNEXURE D.

ANNUAL REPORT OF THE SOUTH AFRICAN RAILWAYS AND  
HARBOURS ORGANISATION, 1935-1936.

BY DR. C. G. BOOKER, *Assistant Health Officer for the Union.*

## ORGANISATION.

During the period under review further very satisfactory progress has been made, both in the advance of the work and in the development of the organisation. No more than three years ago the policy of a gradual extension of the organisation from one which dealt with the control of malaria on two out of the nine "Systems" comprising the South African Railways, to one embracing all phases of health work on all Systems, was embarked upon.

At the outset the policy of training men already in the service, or juniors entering the service, in the wider aspects of the work, was embarked upon and following upon the encouraging results obtained from extending the activities of the organisation to other Systems, this policy has been maintained.

It was realised that the "leavening" process upon which the organisation embarked in transferring the pioneer members of the staff as they qualified to initiate the work on Systems further afield, would be a slow one and it was feared that malaria would suffer as a result of balancing up to compensate the weakness on non-malaria Systems. Time, however, has shown a constant reduction of malaria each year and in spite of the fact, that, at the commencement of the year the organisation had been completed on only some three Systems, namely, the Eastern Transvaal, Natal and the Orange Free State, it is a matter for congratulation that we complete the year with a full complement of staff, with a qualified health inspector or assistant health inspector in charge on four additional Systems, namely, the Western Transvaal, Cape Northern, Cape Western and Cape Midland, whilst the appointment of an independent assistant health inspector to take charge of the organisation on the Cape Eastern System has already been approved of by the Management and is in the course of being made. Upon the remaining System, the South West African Territory, the routine work is being performed by two members of the field staff whilst more important matters receive the attention of a health inspector from an adjoining System which is able to release a man temporarily.

In its infancy when trained men were not available the field work was supervised directly by me, but under the gradual extension to other Systems the policy of de-centralisation or local government was decided upon and experience has shown the wisdom of this step. This office sets the policy of the organisation and co-ordinates the work between the various inspectors but each health inspector, and the field staff he controls, is part and parcel of the System Railway organisation.

In view of the near approach of the completion of the organisation, the time was considered opportune to delineate the definite sphere of the health unit within the Railway organisation and opportunity was taken at a meeting of System Engineers in Johannesburg during February to clinch this matter with these officials. As a result it was decided that the health inspector or assistant health inspector in charge of each System should, in future, work in direct contact with his System Engineer, to whom also he would make requests for structural improvements involving the carrying out of health and hygiene projects, financial provisions for betterment, and to whom he would render a monthly progress report. The success of this measure was instantaneous, as it promotes a great amount of intimacy and progress to the work and gives greater confidence to the field organisation.

In the interests of co-ordination of field work, a meeting took place at headquarters during November, at which the health inspectors were present, when full opportunity was taken of discussing the various aspects of the work and in deciding on points of policy.

In addition to reports on special investigations and weekly summaries of executive work undertaken in the field, each health inspector submits a monthly progress report to this office on standardised lines.

The organisation attained a closer relationship with the Railway curative service during the year by arrangement with the Sick Fund. Apart from the malarious areas, where the health staff has worked in close co-operation with the Railway medical service, the relationship of the latter with the Health Organisation in the past has been obscure, to the obvious detriment of both. The Sick Fund has now arranged for a system of advice of all



cases of notifiable disease occurring amongst railway men and their dependents. In brief the method is for each district secretary of the Fund to report cases immediately to his System Manager who in turn will advise his Health Inspector. Advice is also given to the Central Sick Fund Office, Johannesburg, which keeps this office acquainted of all outbreaks. In this way the field staff is enabled to deal with morbid conditions and more accurately to carry out the preventive work required of them. The system is not yet in full swing as it is of recent origin, but there is every indication that the measure will result in more effective work in the field and to the final good of both the curative and preventive sides of the work.

Any reference to the organisation would not be complete without mention of the contemplated appointment at headquarters of a senior health inspector. This position has just been approved of and the officer selected is one of the organisation's own men. Owing to the wide range of activities of the health organisation which covers some 13,000 miles of line over almost every conceivable range of climate, it has become almost an impossibility for me to keep in adequate touch with the field and correlate all the work personally. The appointment of this officer will further the objects of co-ordination, will permit of regular visits of inspection to go on uninterruptedly and will to some extent compensate for the loss of the Assistant Engineer who was attached to this organisation, but who has now been transferred to the Engineering Department.

#### STAFF.

*Staff Training.*—Following upon the comparatively widespread outbreaks of plague about eighteen months ago arrangements were made at very short notice to appoint men to all sections of line. As a result this year was commenced with a considerable percentage of staff in the grade of learner health foremen still in training. Having completed a year's service in this grade a number of these men sat for the qualifying examination, each at his own headquarters, the successful candidates being graded as health foremen, Grade II. The results show a very small proportion of men who are unwilling or unable to adapt themselves to health work and whose services have had to be dispensed with. Eight learners passed the examination and five ratcatchers whose age and educational qualifications did not preclude them from undertaking all branches of health work have qualified as health foremen during the year. Others of the ratcatching grade are applying themselves to the theory of sanitation. The number of staff completely unfitted for work apart from anti-rodent duties is now very small.

Four learner sanitary foremen and one assistant health inspector (qualified) entered the health service from other Railway departments during the year. There being no one Railway centre dealing with all phases of sanitation and hygiene, the training of young members of the staff singly as vacancies occur is a difficult matter without effecting transfers. This is to some extent overcome by passing each newcomer through the hands of the travelling rodent foreman for three months where he acts as this man's helper. Thereafter the entrant takes the next vacancy occurring and passes through either the Union Malaria Research Station at Tzaneen or a large camp or Railway reserve, on the System to which he is to be appointed. Here he is able to undergo training in camp sanitation, protection of water supplies, food inspection, typhus control, fumigation and disinfection, before taking up his section. As a travelling workman he is precluded from attendance at a recognised course of instruction in sanitation, and whilst correspondence and text-book instruction combined with intensive practical demonstrations have been arranged at reasonable cost to assist theoretical knowledge, the nature of the employee's duties enables him to qualify as a sanitarian. Three health foremen qualified in the examination of the Royal Sanitary Institute during the year.

Whilst in terms of the new grading and establishment of health staff men are not called upon to qualify for the health inspector's certificate of the Royal Sanitary Institute until they are appointed to the position of assistant health inspector, the staff are encouraged to obtain this qualification early on in their careers. In the event of there being no definite vacancy for the position of assistant health inspector, the management has agreed to the awarding of a special increment to men who secure this diploma.

*Duties of the Staff.*—As health and sanitation control measures have been more closely correlated by the advance of the health organisation to new Systems, one point which has had to be recognised is that each territory has its own major problems and its own local peculiarities of working. The object is to dispose staff in such a way as to enable each System to specialise in its own major problems in addition to attending to all other health matters.



The following duties are being regularly carried out by health foremen as a routine under the guidance of the health inspector in charge:—

- (a) The regular sampling of all domestic water supplies.
- (b) The protection of all domestic water supplies.
- (c) The rodent disinfection of stations and premises.
- (d) The disinfection of traffic material offering rodent or flea harbourage at railheads where plague has been discovered.
- (e) Supervision of methods adopted for night-soil and rubbish disposal at stations, at construction camps and wayside gangs.
- (f) Supervision of waste water disposal at quarters.
- (g) The carrying out of disinfection and disinfection measures for infectious disease at staff quarters and other premises.
- (h) Supervision of residential premises.
- (i) Supervision of sanitation and factory hygiene at workshops.
- (j) The carrying out of malaria measures in affected areas.

As the executive work in connection with certain of the above-mentioned measures is in some areas backward, e.g. the provision of french drainage at quarters, rodent proofing of goods-sheds, the construction of Otway pits, special arrangements have been made on a number of Systems for this work to be handed over to the health inspector in charge of the System. If this principle could be more generally agreed to, subject always to non-encroachment on the trades of artisans, the facilities in question would be more expeditiously carried out. As the position is, the works inspector, upon whom this work devolves, is such a harried individual that sanitation and its kindred matters have to give way to other undertakings. Further particulars of this phase are given later in the report and the annexures thereto.

The direction of field work falls to the health inspector in charge, who in turn acts as the connecting link with the System authorities, the public, and this office. He is also responsible for the supply of stores and equipment, pay-sheets, discipline arrangements, the determination of malaria seasons and the carrying out of permanent anti-malaria and anti-rodent work. The health inspector is personally responsible for investigation of infectious disease outbreaks, and field measures for their prevention, and co-operation in such measures with the representatives of adjoining local authorities.

The head office staff of this organisation is nominally attached to the organisation of the General Manager. All matters regarding the staff policy of the health organisation are here dealt with, and staff transfers decided upon through the General Manager's Office on a comprehensive basis. The most successful practice has been to deal with each staff unit as a separate individual, allow him to specialise in the sphere for which he is best suited and station him accordingly.

Direct communication between health inspectors and this office is maintained upon all points of policy or technique.

Records are maintained in this office for the preparation of statistics on malaria incidence and infectious disease among the Railway staff and their dependents. The incidence of plague and rodent infestation, and the rodent proofing of buildings, water samples, the potability and protection of domestic supplies and the method of disposal of waste matter at stations are also recorded.

Apart from the local authorities and members of the public, regular communication is maintained between this office and other sections of the General Manager's Office, all System Managers, heads of other departments and the Union Health Department, Pretoria, Durban and Capetown. The practice is for the detached assistant health officers of the Union Health Department to refer any Railway health matters in which they may be interested, through this office.

*Outside Local Authorities.*—Co-operation with outside local authorities has been maintained on excellent terms and good work has been carried out on a common basis.

*Disposition of Health Staff.*—The following table shows the disposition of the staff as at the close of the year. The main points of difference compared with last year are:—

- (a) The diminution of men in the grade of ratcatcher.
- (b) The promotion of learners to the grade of health foremen.
- (c) The appointment of three additional inspectors.



TABLE I.—THE NUMBER AND DISPOSITION OF VARIOUS GRADES OF STAFF UNDER THE CONTROL OF THE SOUTH AFRICAN RAILWAYS AND HARBOURS HEALTH ORGANISATION.

	Cape Western.	Cape Northern.	Cape Midland.	Cape Eastern.	Orange Free State.	Natal.	Western Transvaal.	Eastern Transvaal.	South-West Africa.	Total.	SALARIES.
Railway Health Officer.....				1	for all	Systems				1	£1,300
Office Assistant..				1	"	"				1	360
Typist.....				1	"	"				1	132
Rodent Foreman				1	"	"				1	240
Health Inspector	1	(1)	—	—	1	—	1	(1)	—	3	1,015
Assistant Health Inspector.....	1	—	1	—	—	1	1	—	—	4	1,120
Health Foremen, Grade I.....	1	1	—	—	—	3	—	2	1	8	1,632
Health Foremen, Grade I... ..	2	1	—	1	1	4	2	3	—	14	2,184
Learner Health Foremen.....	—	—	2	—	4	1	—	—	—	7	940
Ratcatchers.....	3	—	1	1	2	—	2	—	1	10	1,980
Non-European Labourers.....	3	2	2	2	6	48	4	22	2	91	2,730
TOTAL.....	11	4	6	4	14	57	10	27	4	141	£13,633

This is probably the first attempt yet made to arrive at an estimate of the cost of the completed South African Railways field health organisation and the occasion is opportune for certain observations. The Interdepartmental Malaria Committee appointed in 1931 to investigate the whole question of the control of this disease upon the Railways recommended the appointment of a health staff in the affected areas of the Transvaal and Natal. The Committee's recommendations included an estimated annual cost for such a staff for these two areas alone, of £9,087. At the time in question the Department also possessed in an entirely unorganised form, the services of some twenty-five ratcatchers and their assistants at an approximate annual cost of £6,000, some thirteen full-time fumigators costing approximately £3,276 and a number of sanitary inspectors, foremen and other grades. The estimated cost of the proposed anti-malaria organisation, together with the then existing rodent and other grades, thus totals approximately £19,000. It is worthy of note that the annual maintenance costs of the present health organisation is considerably less than this figure. Furthermore, the organisation is one which has in a short space of time assumed the organised control of all Health work on all Systems with one definite policy in view, and links up the whole Railway System with the rest of the Union health authorities, which was entirely impracticable under pre-existing conditions.

In recommending the anti-malaria organisation the Interdepartmental Committee anticipated an estimated saving to the Administration and its Sick Fund Organisation to the extent of £7,000 annually under some eight heads of expenditure. Over five of these items this organisation has no direct control, but the remaining three involve—

- (1) the amount borne by the Administration in sick pay;
- (2) the amount borne in relief expenditure and allowances to relief staff;
- (3) the cost of sick pay borne by the Sick Fund.

The Committee estimated the total of these three items at £5,745 annually under pre-control conditions, and that following upon proper organised malaria control they would total £2,872 per annum. In actual fact these items subsequently proved to be £6,021 for the year 1932, when control measures were commenced. The success of the organisation's control measures may, however, be judged from the following figures for subsequent years of actual expenditure under items 1, 2, and 3. The figures serve to indicate that for the items that are on record the field organisation has assisted in bringing about reduced expenditure greatly in excess of the Interdepartmental Committee's anticipations.

Estimated cost of sick pay and relief expenses prior to 1931 ... .. .	£5,745 per annum.
Estimated cost per annum following control measures ... .. .	£2,872 per annum.
Actual cost, 1932 ... .. .	£6,021
„ „ 1933 ... .. .	£1,199
„ „ 1934 ... .. .	£1,341
„ „ 1935 ... .. .	£519
„ „ 1936 ... (January to June) * ...	£395

### ANTI-RODENT AND PLAGUE MEASURES.

*Organisation.*—This work is of major importance on every section of the line, owing to the International and Union aspect, and from the economic point of view. Thus all sections of line have been serviced continuously during the year. Table II shows the approximate number of miles of track patrolled, and other essential features in regard to anti-rodent work on the various Systems. It, however, takes no cognizance of larger depots which are spread fairly evenly over the Union and which require the more constant service of the staff concerned.

*Policy.*—The policy originally formulated has been adhered to. This briefly is—

- (i) to build out the rat by preventing ingress and egress;
- (ii) to reduce nesting and harbourage;
- (iii) constant rodent destruction by gassing, trapping, poisoning, etc.

#### I. RATPROOFING.

A considerable sum is applied for each year by Systems for the rodent-proofing of buildings. The departmental type drawing is adhered to. The chief work necessitated is a concrete or asphalt floor, the application of 19-gauge wire netting or flat iron to eaves, wallplates, ridging and window spaces, and the efficient closing of doors.

The principle of training carpenters in the Orange Free State in the details of rodent-proofing has been maintained. This has resulted in more perfect work and has reduced the necessity of the field staff completing the work. In the Orange Free State the carpenter is under the full control of the Health Inspector, and at the same time undertakes the measures necessary for protecting water supplies.

While there is a need for rodent-proofing on every System, definite and accurate information showing the weak points geographically throughout the country, has hitherto been absent and a preliminary proofing policy was set in regard to plague areas, grain districts, ports and large towns. During the year a vast amount of work has been done in respect of rodent distribution and although this survey has not yet been completed a more accurately defined policy has been framed. This policy takes into consideration such factors as the nature and degree of rodent infestation, plague foci, grain, industrial and port areas. Large tracts of country such as the Karroo where rat-proofing would be a waste of money, owing to the absence of domestic species, are excluded, save for isolated centres where commercial activity has given the rat a foothold.

Table II indicates other essential features in regard to anti-rodent work on the various Systems.

TABLE II.

System.	Miles of Line.	No. of Sections.	Total No. of Sheds.	No. of Sheds Proofed.	Proportion of Programme Complete.	No. of Rodents Destroyed.
†Cape Western.....	1,800	4	144	60	58	5,214
†Cape Eastern.....	1,150	2	145	26	19	?
†Cape Midland.....	1,300	2	160	6	7	618
						(Feb.—June)
‡Cape Northern.....	986	2	76	20	26	} 4,784
‡Orange Free State Natal.....	1,600	6	112	99	88	
†Western Transvaal	1,680	5	357	108	31	4,220
†Eastern Transvaal.	900	4	109	22	20	5,250
‡South-West Africa	1,750	3	126	6	15	1,137
	1,880	2	54	—	—	?
TOTAL.....	13,046	30	1,283	347	33 average.	21,223

\* Includes most intensive period.

† Areas where definite plague reservoirs exist.

‡ Areas where intermittent outbreaks occur.



*Orange Free State.*—In view of the abundance of domestic and veld rodents, the numerous grain elevators and co-operative stores, and the regular visitations, and widespread nature of plague on this System no differentiation in stations has been made.

As will be seen the proofing programme is virtually complete—99 out of 112 or 88 per cent. of the sheds have been proofed. The general state of the sheds is good and a very high standard of proofing has been adopted. Apart from the routine visits paid to the various stations by the System staff some seven hundred visits were made by the rodent foreman and myself in connection with proofing policy, rodent surveys and plague outbreaks.

*Cape Northern.*—This System with its numerous grain elevators and co-operative stores is almost of equal importance as the Orange Free State. Although domestic rodents are not so numerous, veld rodents are plentiful and plague outbreaks are common. For these reasons it was considered necessary to advise a fairly comprehensive proofing programme which, however, does not cover all the sheds on the System. There are some 81 sheds on the System. Some 20 sheds (or 26 per cent. of the programme) are shown perfectly proofed. This is, however, a very unreliable guide to the amount of work done as the number is rapidly being added to month by month in perfecting work previously done. Apart from the routine visits by the local staff this System received 250 visits.

*Cape Eastern.*—This System is to some extent an unknown quantity in the absence of a health inspector, but with the imminent appointment of an officer a more detailed programme will be determined.

There are some 145 sheds on the System, 26 of which have already been done including most of those on the Umtata line where infestation has been too heavy to control by gassing and trapping alone. A considerable amount of work is necessary on the Barkley East and other lines adjoining the Orange Free State, where plague occurs and rat and gerbille infestations are regular factors. During the year this System received some 250 visits.

*Natal.*—On this System there are some 357 sheds, 108 of which have been proofed. This represents 31 per cent. of the programme. The extent of the work on this System was determined mainly by the very heavy rat infestation in sheds, together with the threat of plague from the Orange Free State. The state of the sheds is good and an excellent standard of proofing has been adopted. In the coastal belt the programme is practically complete, and the general state of infestation has dropped from very heavy to slight, with a corresponding reduction in damage to goods and nuisance to our staff. Although the work has been maintained in the Pietermaritzburg and Ladysmith sections by two carpenters originally sent to the Orange Free State for training, the progress has not been so rapid and the degree of infestation has remained heavy at unproofed stations. Efforts are now being concentrated on the Harrismith-Ladysmith section in view of the direct connection with the Orange Free State. The control in the Durban harbour area has never been on a satisfactory basis on account of the ambiguity of fixing responsibility. During the year two meetings attended by representatives of the Union Health Department, Port Health Authorities, the Local Authority and the Railway were held at which an agreement was arrived at as to the responsibility in the various districts. A carpenter who is attached to the Harbour Engineering Department and who is at present under training in the Orange Free State, will on his return commence the proofing programme in this area.

*Eastern Transvaal.*—Outbreaks of plague on this System have been infrequent and co-operative stores and grain elevators are scattered and not very numerous. The proofing programme was determined, therefore, in relation to sections which are too heavily infested with domestic rodents to make their control possible by gassing and catching alone.

The whole System comprises some 126 sheds but only 32 per cent. are in the programme. Very little proofing has been done on this System—only some 6 sheds being satisfactorily proofed. A full-time carpenter has, however, now been appointed to this work, and it is anticipated that future progress will be well maintained.

*Western Transvaal.*—The activities on the Reef together with the grain elevators, co-operative stores and heavy domestic and veld rodent infestation everywhere made it necessary for this System to adopt a comprehensive rodent-proofing programme, especially in the face of the constant threat of plague from the Orange Free State and Cape Northern Systems. The System contains some 109 sheds, all of which are included in the programme. Twenty-two sheds—20 per cent. of the work—have been done, but at the present moment, owing to the greatly increased Railway development, rat-proofing is practically at a standstill. It is likely that the work will be recommenced at an early date as a result of representations to appoint separate carpenters to carry on with the programme. Some 350 visits were made to this System apart from those paid by the local staff.



*Cape Western.*—This System contains 144 sheds about 50 per cent. of which are included in the programme. 60 sheds—58 per cent. of the work—have already been completed. The proofing on the Bitterfontein line consolidates the barrier, partly natural and partly artificial, which has been established for protecting the Peninsula from the north-western plague area. The work on the main line up to and including De Doorns is also complete. On the remaining sections where proofing is necessary, the Mossel Bay and Saldanha Bay lines, the work is well in hand. A difficult section, purely from the viewpoint of infestation, is the short suburban Peninsula line. This is, however, an outdoor infestation in which the Local Authorities concerned will sooner or later have to co-operate. Apart from the usual visits by the regular staff some 250 visits were paid to this System in connection with proofing and anti-rodent measures.

*Cape Midland.*—This System contains some 160 sheds, only 6 of which have been proofed. The condition of the sheds is bad and the infestation on some sections is very heavy. Although a considerable number of sheds requires proofing long stretches of line require none. 60 per cent. of the sheds are already provided with concrete floors, but the rest of the proofing, however, is far behind hand. The work is commencing in earnest on the coastal branches shown, and in view of the presence of plague a few miles north of Port Elizabeth this line will be one of the first included. During the year some 500 visits were made to this System apart from those made by the System Manager's staff.

## II. PREVENTION OF NESTING AND HARBOURAGE.

Men engaged upon rodent destruction measures have been instructed to mark all shed floors with a white paint line eighteen inches from the wall, and all concerned are instructed not to stack goods over this line. This enables the men to gas from all sides, and also prevents the goods from damaging the walls of sheds and causing openings.

On the whole the station staff adhere to these requests.

Endeavour is made to insist upon the stacking of goods upon dunnage. At many stations tarpaulins, coal and records, are still stored in sheds and are a source of great trouble. Such records on certain Systems are not stacked in goods sheds but on proper shelves provided for the purpose. The provision of boiler tube enclosures for tarpaulin and coal is most desirable.

## III. ROUTINE DISINFESTATION, AND CO-OPERATION IN ANTI-PLAGUE MEASURES.

Disinfestation by trapping, baiting and gassing has been maintained by health foremen and ratcatchers on all sections continuously throughout the year as a routine measure. On the Orange Free State and Cape Northern Systems approximately 4,000 lb. of cyanogas was used in combined disinfestation and plague measures during the year.

Although the principle of free movement of these men over their sections has been continued as in previous years, the appointment of additional supervisory staff over further Systems has made for a tightening up in the control of the work and generally speaking infestation is much lighter throughout the Union. The number of rodents destroyed during the year is 21,223, but this figure does not make any allowance for rodents which have died of poison or gas in inaccessible places.

One would be very bold in asserting that when the proofing programme is complete no further disinfestation work would be necessary on proofed sections, but all the available data show that this will be tremendously reduced. The prevention of harbourage within Railway goods sheds is a great factor in eradicating rodent trouble and preventing damage to goods. At a great many centres, however, Railway premises are in very close proximity to those of storekeepers and grain factors, the vast majority of whom allow very little capital expenditure for good storage facilities. These people are therefore, greatly responsible for permanent infestation in the neighbourhood of Railway premises. As a result of inspection such owners are constantly being reminded of their obligations to disinfest buildings, little or no attempts are made, however, to enforce the rodent-proofing regulations or to insist upon the provision of better structures for the storage of grain. Until this position is improved overflow infestation from private buildings to Railway premises must take place to a certain extent.

So far as can be ascertained from the data available in the short period since the adoption of rodent-proofing, troublesome infestation necessitating the repeated attendance at certain stations of the rat-catching staff is fast disappearing. When such does occur it is usually found to be due to the presence of "unlawful" material, e.g. the storage of building equipment or tarpaulins for protracted periods, the importance of which may not be fully appreciated by the resident staff. In support of the assertion it may be stated that certain test stations were taken as examples. These stations were known to have had bad histories from a domestic rodent viewpoint. The figures show the number of rodents destroyed before and after rat-proofing.



The advantages at once apparent are the time saved by the health staff in disinfecting operations, which is now available for other inspection and executive work, apart from the consequent saving of gas and other material and the reduction in claims for damaged goods.

TABLE III.

Results of rodent catches at stations before and after rodent-proofing:—

Station.	Rodents caught during 12 Months before Proofing.	Rodents Destroyed in 12 Months after Proofing.
Greylingstad.....	275	59
Sandspruit.....	128	29
Paardekop.....	325	49
Platrand.....	198	25
Heidelberg.....	141	32
Standerton.....	279	18
Randfontein.....	43	9
Wepencr.....	108	19*
Modderpoort.....	85	23*
Marscilles.....	14	13*
Sannaspos.....	25	14*
Worcester.....	106 (Six months)	39 (Six months)
De Dooms.....	91 " "	50 " "
Eendekuil.....	19 " "	2 " "
Vredenburg.....	33	—
<b>TOTAL.....</b>	<b>1,870</b>	<b>381</b>

\* In these cases only mice were destroyed.

The figures indicate that average infestation after proofing has been reduced by 80 per cent. for rodents generally and even more for rats.

At Eendekuil the two rats were " nosed " by the ratcatcher's dog in a crate which had arrived the day previously. Vredenburg had previous to proofing a heavy rodent population. On the Bitterfontein line, where all sheds are rat-proofed and where there is still a large outside rat population, it is quite the exception to find anything but mice and veld rodents.

The following particulars in respect of Natal stations, indicate not only the value of good rodent-proofing work, but ably demonstrate the waste of money and uselessness of placing artizans on rodent-proofing who are untrained in the peculiarities of this work.

#### PROPERLY PROOFED SHEDS.

STATION.	DATE PROOFED.	RODENTS DESTROYED.			
		July to Dec., 1934.	Jan. to June, 1935.	July to Dec., 1935.	Jan. to June, 1936.
Bloedrivier.....	August, 1935.....	17	11	—	—
Nottingham Road.....	April, 1935.....	35	16	—	—
Schroeders.....	May, 1935.....	23	18	5	—
Edendale.....	May, 1935.....	19	27	2	2
Mount Edgecombe.....	July, 1935.....	7	18	3	—
Compensation.....	July, 1935.....	17	11	2	—
Mtunzini.....	April, 1935.....	8	2	—	—
Inyoni.....	April, 1935.....	29	18	1	—
Hluhuwe.....	May, 1935.....	—	16	7	—
Chaka's Kraal.....	July, 1935.....	6	7	—	—
<b>TOTAL.....</b>		<b>161</b>	<b>144</b>	<b>20</b>	<b>2</b>

#### SHEDS INEFFECTIVELY PROOFED.

Dalton.....	February, 1935.....	No record	22	16	No record
Paulpietersburg.....	May, 1935.....	34	18	26	"
Commondale.....	October, 1934.....	53	37	52	65
Phoenix.....	February, 1934.....	19	11	14	8
<b>TOTAL.....</b>		<b>106</b>	<b>88</b>	<b>108</b>	<b>73</b>

Faulty work on sheds is usually corrected by the foreman for the section, but much labour and needless infestation would be saved if all concerned would realise the importance of training artizans who are to undertake this work.

Before concluding on the aspect of disinfection, mention must be made of the efficiency of the young staff now engaged upon the work. When the original rodent staff of the Railways was first gathered together for the purpose of being trained in the wider aspect of rodent, plague, and health work, the vast majority of the staff consisted of men above the age of forty years, whose success in the craft of ratcatching was considered to have been derived from a natural cunning, plus many years of experience. When the new grading proposals, which aimed at the exclusion of the grade of ratcatcher, were decided upon, a certain amount of apprehension was felt in some quarters, that the junior men of twenty years and upwards, who would eventually replace existing ratcatchers would not be mature or capable enough to perform the rodent-catching duties. These fears have proved to be entirely baseless, and on the contrary experience is proving that young men are as reliable as their predecessors and in many instances much more enterprising and capable of applying greater acumen to this work.

*Anti-Plague Measures.*—The policy of co-operation with the field staff of the Union Health Department and local authorities has been continued. In the majority of cases the first advice of a plague outbreak is given to this office by telephone from the Union Health Department, Pretoria. Particulars are telegraphed to the health inspector concerned. This official immediately instructs the man for the section to proceed to the railhead nearest to the point involved, where all premises are disinfested. Pending the lifting of quarantine over the affected area, the health foreman stands by and treats with cyanogas all merchandise offering for traffic that may harbour rodents or fleas. When the Union Health Department's staff are hard pressed or when the local authority has no organised measures, the Railway health staff has given assistance off Railway premises.

During the year outbreaks were not quite so severe as during the previous twelve months, and although a sufficient number occurred to keep all members of the staff continuously engaged in country endemic areas, it was unnecessary to draft additional staff from other quarters to the Orange Free State as in past seasons. The tremendous epizootic of 1934-1935 and the greater reduction of veld rodents during that period is to my mind responsible for the reduced plague activity and the lesser human incidence this season. It is clear that whilst local authorities in certain areas and the public generally are not yet fully alive to plague dangers, the spread of the disease still seems to be governed by the direct link between the infected veld rodent and man. In almost all cases that have occurred the indications are that infection takes place when the human being ignores the direct contact with the veld rodent. Fresh foci continue to show themselves in the country districts, but there is no evidence that infection is being spread from point to point through the medium of any domestic species of rodent which in the Railway sphere is the major consideration. At the moment it is fortunate that at strategic points leading to larger communal centres in areas free from endemic veld plague the natural barriers still continue to hold. Thus for example, although plague regularly occurs in the Viljoensdrift area which is very close to Johannesburg and the Reef, infection spreads no farther north year by year. Likewise the two routes of entry to Natal and the Transvaal respectively *via* Bethlehem continue to remain free.

Details of incidence of plague from July, 1935, to June, 1936, in the control of which this organisation co-operated at railheads, are as follows:—

#### 1935.

- July... .. No human cases were reported.
- August ... .. A plague rat was found at Wolwehoek.
- September ... .. Human cases occurred at Tweespruit, Thaba 'Nchu, Bloemfontein.
- October... .. Meadows, Kroonstad, Bloemfontein, Ventersdorp. A number of cases occurring in the Bloemfontein district, also at Koffiefontein.
- November ... .. Human cases occurred at Heilbron, Wolwehoek, Rouxville, Bultfontein, Koffiefontein, Bothaville, Brandfort, and Trompsburg.
- December ... .. Human cases occurred at Bloemfontein, Odendaalsrust, Ventersdorp, Boshoff, and Dealesville.

#### 1936.

- January... .. This was a severe month, cases occurring at Excelsior, Winburg, Boshoff, Coalbrook, Viljoensdrift, Ventersdorp, Kuruman, Bloemfontein, Thaba 'Nchu, Edenville, Heilbron, Vredefort, Kroonstad, Holfontein, Dewetsdorp, and Trompsburg.



- February ... .. Human cases were reported at Fauresmith, Petrusburg, Kroonstad, Bloemfontein, Heilbron, Thaba 'Nchu, Hoopstad, Odendaalsrust, Wesselsbron, Winburg, Viljoensdrift, Rouxville, Boshoff, Ventersburg, Dewetsdorp and Senekal. This was also a severe month.
- March ... .. During this month cases occurred at Ventersburg, Hoopstad, Odendaalsrust, Bultfontein, Vredefort, Bloemfontein, Senekal, Winburg, Dewetsdorp, Kroonstad, Holfontein, Coligny, Lichtenburg, Clocolan, and Calvinia.
- April... .. Further plague cases were reported at Kuruman, Hoopstad, Wesselsbron, Klerksdorp, Geneva (this case on Railway property), Kroonstad, Holfontein, Jacobsdal.
- May ... .. During the early part of this month no cases were reported, but towards the end cases occurred at Thaba 'Nchu, Bothaville, Smithfield, and Uitenhage.
- June... .. Cases were reported at Smithfield, Wepener, Boesmanskop, Zastron, Lindley, Winburg, Kroonstad, Hoopstad, Wesselsbron, and Bloemfontein.

*Distribution of Plague over Systems.*—Measures in all the above outbreaks were instituted by the health inspector, Orange Free State, except in the following:—

Calvinia district: Health Inspector, Capetown.

Uitenhage district: Health Inspector, Port Elizabeth.

No outbreak occurred in the Transvaal areas this year.

Active co-operation by the Railway staff was given to local authorities in the Vereeniging, Coligny, Calvinia, and Uitenhage areas.

The rodent foreman, whose major duties are to inspect sheds and the rodent-proofing progress throughout the Union, took part in active plague measures in the Orange Free State during the busiest part of the season.

Only one human case of plague occurred on Railway premises, namely, at Geneva. An occupant of a European labourer's cottage became infected. Measures were taken by the Orange Free State health staff.

## MALARIA.

Four years have now elapsed since the Administration's anti-malaria campaign in Natal and Transvaal was first inaugurated. The malaria areas of the Union have proved an excellent training ground for the Health Staff, and as has been previously indicated the supervisory members for other Systems have all passed through these areas.

The anti-malaria policy remains unchanged. This has been clearly defined in my previous reports. That this policy is sound is borne out by the satisfactory results obtained, which have been bettered every year since malaria prevention measures were first commenced. The areas under control and the population protected have been dealt with in previous years.

### MALARIA CONTROL MEASURES.

I. *Larvicidal Work.*—As in the past regular larval surveys were maintained throughout the winter months and whenever *A. gambia* larvae were collected oiling operations were immediately begun. The search for larvae was supplemented by regular searches for adult vectors. In this way the field staff are kept well informed as regards the commencement of the season and are able to anticipate outbreaks of malaria fairly accurately.

The meteorological factors favourable for the breeding of vectors in the Transvaal have been optimum for the period under review. The rainfall has been greater than at any time since the commencement of the campaign and together with this high mean temperatures were sustained. The abnormal rainfall resulted in the Komati River being in flood for the greater part of the season and the high water mark was higher than ever before, with the result that the islands in the middle of the river were at times completely submerged and when the water subsequently receded collections of water remained which formed ideal breeding places. The force of the water and the fear of crocodiles made it impossible to treat these collections of water for a considerable time. This resulted in very high adult catches within the township of Komatipoort and a corresponding rise in the number of



malaria cases. A recurrence of these conditions is not anticipated, for suspension wires have been stretched across the river to enable the oilers to reach the islands safely under all conditions.

Anti-malaria oil was again used as a larvicide in both Provinces. On both Systems the oil shows an increase. In the case of the Transvaal this has been due to greater rainfall, and in Natal the increased consumption is accounted for through the Administration having taken over the control of the Crown lands adjacent to the Blue Lagoon in Durban. The cost of this latter, however, is recoverable. A total of 28,965 gallons of oil in the two Provinces at a cost of £724. 7s. 6d. was used. This represents an increased consumption of 1,277 gallons over the previous year.

*Insecticidal Work.*—During the season, both in the Transvaal and Natal, conditions arose which would have caused intense and widespread malaria amongst the servants of the Administration. In Natal drought conditions prevailed on the North Coast until the middle of January, 1936, when the first rain fell and small collections of standing water were seen from Gingindhlovu to Gollel. Rain fell at intervals throughout February and March. Temperatures remained high and conditions were ideal for the development of the malaria vectors, which did not appear in any number until about the middle of February.

From the end of the first week in February *A. gambia* assumed alarming proportions in the course of three weeks, north of Empangeni, and news of several fresh infections in outside areas was received. The health staff had by this time already been warned to intensify control. Special warnings were issued through the medium of the weekly circular to all staff along the North Coast and supplies of pyagra and quinine were issued to all stations and gangers. Epidemic malaria was anticipated and precautions were rigidly enforced. The response at first was only half-hearted, but later co-operation was excellent. The menace proved to be so considerable as to warrant bi-weekly and, at the larger centres, tri-weekly spraying of all railway-owned dwellings north of Tugela.

Two members of the health staff and extra native labour were drafted from the comparatively free areas of the South Coast and Maritzburg to Zululand, and intensive tri-weekly house-to-house spraying was embarked upon. The success of these operations was immediate and at the end of the first week the infestation rate had dropped to under one-tenth of the previous rate.

At several stations, notably those between and including Hluhuwe and Gollel a satisfactory reduction in the adult infestation was not obtained until it was decided to extend larval control further afield. The desired effect was obtained within a few weeks. The greatest trouble was experienced from outside areas and the extent to which the danger existed is very well demonstrated by the fact that out of the total number of 712 adults collected at Mkusi, Mtubatuba, Mposa, Nkwambonami and the Nkwaleni line, 706 were collected in habitations outside and adjoining railway property.

The success of the campaign may be appreciated from the fact that while the numbers of *A. gambia* adults captured were in the ratio of 1,694 to 6 for the previous year the incidence of malaria was only 40 as against 90 cases for the same period.

In the Transvaal when the islands in the Komati River were found to be inaccessible the health foreman normally engaged on anti-rodent and general duties was drafted to that centre for the purpose of spraying all habitations in and about Komatipoort daily. This measure was instrumental in keeping down the incidence of malaria to a great extent, but in spite of this a number of cases attributable to the uncontrolled breeding occurred.

This is borne out by the fact that 80 per cent. of the cases at Komatipoort were contracted by members of staff on night duty. The remaining 20 per cent. were composed of gangers, and it is quite probable that these members had occasion to do night duty at times of washaways, which were fairly numerous at Komatipoort last season. This also, no doubt, accounted for a number of the cases amongst the running staff stationed at Waterval Boven.

The number of cases of malaria contracted by employees last season on night shift has confirmed my observations of previous years that the theory that over 90 per cent. of malaria is contracted in bedrooms has been greatly exaggerated. The use of mosquito repellent smear was, therefore, advocated and distributed amongst members on night duty early in the season.

The proprietary product Pyagra, mixed 1:20 with paraffin, was again exclusively used in Natal and Transvaal. 104 gallons more than the previous year were used in the Transvaal. Most of this was used at Komatipoort for reasons which have been mentioned. The unprecedented conditions which arose in Zululand also accounted for more Pyagra being used on this System.



As in previous years all larvae and adults collected by the field staff were identified, recorded and reported at weekly intervals. The following table shows the activity of the field staff in this direction:—

	GAMBIA.		FUNESTUS.		OTHER SPECIES.	
	Larvae.	Adults.	Larvac.	Adults.	Larvae.	Adults.
1935—						
October.....	36	—	—	4	229	—
November.....	36	1	—	4	206	2
December.....	19	2	—	2	321	4
1936—						
January.....	139	52	1	6	298	26
February.....	426	520	15	3	1,002	240
March.....	757	3,211	—	11	1,077	230
April.....	942	4,471	—	4	831	124
May.....	254	1,082	—	2	274	293
TOTAL.....	2,609	9,339	16	36	4,238	925

The total *A. gambia* adult catch for the corresponding period of the previous year was only 603 as compared with 9,339 for the season under review.

*Permanent Measures.*—During the winter months when mosquito breeding is at a temporary standstill, malaria control work was confined mainly to permanent measures. Breeding places located previously were wherever possible, done away with. The work was carried out by the regular anti-malaria gangs under the supervision of the health foreman detailed for this work, and, for major works, assisted by casual labourers. The work done was planned and carried out under the supervision of the health inspectors in collaboration with System and District Engineers.

In Natal the work was carried out by a gang of twenty regular native oilers under a health foreman and most of it was done on the North Coast. In the Transvaal two health foremen were detailed for supervising the natives. On the northern section a gang of ten regular native oilers assisted by five casual natives, and on the eastern section a gang of ten oilers carried out the work. The nature and amount of work effected during the year is shown in the following table:—

PERMANENT ANTI-MALARIA MEASURES.

	NATAL.	TRANSVAAL.	TOTAL.
Subsoil pipe drains.....	1,712 yards.	— yards.	1,712 yards.
Concrete drains.....	— ”	273 ”	273 ”
Earth drains.....	3,685 ”	1,526 ”	5,211 ”
Stone drains.....	28 ”	— ”	28 ”
Surface drains cleared.....	7,300 ”	6,753 ”	14,053 ”
Depressions and borrow pits filled in.....	28 ”	279 ”	307 ”
Trees planted.....	6,255 ”	7,250 ”	13,505 ”

*Other Works.*—At Komatipoort a squad ganger with a gang of 12 natives busy on levelling the river bank in order to do away with depressions and side streams, shifted some 8,800 cubic yards of earth. To date a stretch of 1,200 yards has been levelled. In addition to this several hundred rock pools have been filled in with cement.

Due to flood water the anti-malaria cement drain at Komatipoort was twice completely silted up last season. On both occasions large holes were washed out next to the drain. The cleaning of the drain and filling in of the holes was a very big undertaking and took a gang of twelve natives six weeks to complete.

At Mokeetsi a drain 3½ ft. by 4½ ft. was cut down the middle of the river for a distance of 3,640 yards. All the water is now confined to this drain and only in cases of very heavy downpours does the water overflow. The river, therefore, is now more easily and economically controlled.

The course of a stream was diverted at Letaba which necessitated the digging of a 600-yard drain. The existing stream had in turn to be filled in for a distance of 300 yards.

For the purpose of restoring vegetation and preventing cattle hoof-prints, two miles of fencing was erected at Gingindhlovu and one mile at Empangeni. The Health Committee of Gingindhlovu contributed £30 towards the cost of the fence at that centre.



In June, 1935, the Durban Corporation Health Department approached the Administration in regard to malaria control of the Government lands north of the Umgeni River, within the Borough of Durban. The Administration agreed to undertake full control of the property in question for which service the Department of Lands re-imburses the Administration in full. This arrangement has now been in vogue for one season and has given satisfaction.

*Screening of Quarters.*—The condition of gauzing on the North Coast was maintained in good order with difficulty; a great deal of corrosion has taken place and much replacement will be required during the winter months. Up to the present "Monel" gauze has been used on the coast, but "Barronia" gauze which costs less and is stated to be as durable in coastal areas is under trial.

In the Transvaal a tremendous amount of improvement to screening in general has been carried out during the course of the year. It is fully anticipated that with the commencement of the next malaria season all houses in malaria areas will be perfectly screened. In the Transvaal bronze gauze answers quite satisfactorily.

Since the submission of my last report the Administration has decided to screen all the quarters occupied by the domestic servants at Komatipoort. This work has already partly been done and will be completed within the next few months. Komatipoort is the only centre in the Transvaal where screening of native quarters has been undertaken, but the malaria at this centre is so intense that it was felt that all possible means of combating the disease should be utilised. The public at Komatipoort were approached and are also actively co-operating in this measure.

#### RELATIONSHIP TO LOCAL AUTHORITIES AND PRIVATE INDIVIDUALS.

As a result of the continued relationship of amity between the Administration's Health Staff and Local Authorities much good work was done on a common basis.

Various satisfactory forms of co-operation were arranged with different bodies undertaking malaria control adjoining railway property. Some examples of arrangements arrived at are given below:—

- (1) At Pietermaritzburg, Verulam, etc., material was contributed by the Administration in return for spraying on its property.
- (2) At Empangeni, Mandini, etc., material was contributed by the local authority in return for labour outside railway premises.
- (3) At Kaapmuiden, etc., the Administration was reimbursed for work performed outside railway property.
- (4) At Nelspruit, Tzaneen, Louis Trichardt, etc., it was arranged that the Administration and local authorities control definite areas independently, with the understanding that each party be allowed to check the work of the other.

Co-operation with the Union Health Department has been well maintained and problems have been jointly tackled and satisfactorily overcome.

*Malaria Incidence.*—In spite of unprecedented conditions which had to be contended with the malaria incidence has again dropped during the period under review, but there is still room for much improvement at certain centres in the Transvaal. In Natal the control measures carried out at inland centres have been very effective.

At Letaba and Tzaneen in previous years *A. funestus* had been the greatest problem but as a result of systematically clearing the river and streams of vegetation within the controlled areas and the planting of gum trees to absorb seepages a stage has now been reached when the danger constituted by this vector is negligible. The trees planted the first year are now beginning to have the desired effect. As a result of these permanent measures supplemented by regular larvicidal and insecticidal methods no cases of malaria have occurred within the controlled areas.

At Kaapmuiden the farmers adjoining railway property co-operated excellently. Two high-pressure pumps were acquired by them and they carried out disinfestation measures of all their native huts as often as advised by the field staff. They contribute £12 yearly towards the cost of controlling malaria at that centre.

At Louis Trichardt a severe epidemic was experienced, approximately two hundred private residents in the town contracting the disease. The railway staff at this centre reside some distance from the town and notwithstanding the fact that the same conditions obtained, railway control was well maintained and no cases occurred.



The additional measures instituted at Komatipoort have already been referred to. That these were highly warranted is illustrated from the following table which gives a comparison of the rainfall and *A. gambia* adult catch for the last two seasons at Komatipoort.

Month.	Adult Catch.		Rainfall in Inches.	
	1935.	1936.	1935.	1936.
January.....	37	13	4.72	8.01
February.....	105	221	2.26	2.59
March.....	22	973	0.25	10.44
April.....	1	1,173	0.33	1.35
May.....	—	620	0.78	0.03
TOTAL.....	165	3,000	8.34	22.42

#### MALARIA INCIDENCE, ANOPHELINE CATCHES AND METEOROLOGICAL FACTORS.

Rainfall, temperature and humidity, the all important factors in the transmission of malaria, were ideal for the development of the malaria vector last season, the degree to which the meteorological factors influenced the prevalence of vectors and the incidence of malaria is shown in the table below. The items concerning Natal refer only to the North and South Coasts. The figures for Transvaal are the average for the most representative centres in the malaria areas.

#### RELATION OF MALARIA INCIDENCE TO ANOPHELINE CATCHES AND METEOROLOGICAL FACTORS.

Month.	Rainfall.		Mean Temperature.		<i>A. Gambia.</i>				Malaria.	
	Transvaal.	Natal.	Transvaal.	Natal.	Larvae.		Adults.		Transvaal.	Natal.
					Transvaal.	Natal.	Transvaal.	Natal.		
1934—										
October.....	1.68	1.91	—	69.80	—	8	—	15	—	1
November.....	4.95	2.95	72.00	72.50	46	48	3	40	1	—
December.....	5.46	8.15	73.80	73.90	73	43	98	13	—	2
1935—										
January.....	4.49	3.77	74.40	74.70	80	95	86	13	1	1
February.....	2.05	4.91	71.05	74.20	230	183	252	2	1	2
March.....	1.49	5.58	71.95	71.90	132	115	72	—	2	2
April.....	0.59	2.50	68.60	70.40	225	113	17	—	5	1
May.....	0.84	6.90	63.53	66.30	7	12	2	—	—	1
June.....	0.33	12.96	57.62	62.25	—	—	—	—	3	—
July.....	0.07	0.54	59.29	63.27	—	—	—	—	3	1
August.....	0.06	3.35	58.98	65.81	—	—	—	—	—	1
September.....	0.69	1.04	66.81	66.33	—	—	—	—	—	2
October.....	1.22	2.62	73.10	68.93	—	36	—	—	—	3
November.....	0.77	1.98	72.45	71.60	—	36	—	—	—	3
December.....	2.42	2.24	73.63	71.43	9	10	2	—	—	1
1936—										
January.....	6.71	6.97	76.85	73.75	89	50	52	—	—	1
February.....	4.40	9.94	74.34	73.50	386	50	477	43	3	2
March.....	5.34	5.19	72.27	75.17	615	142	2,321	890	2	2
April.....	1.42	1.29	69.48	70.90	699	243	3,754	717	11	5
May.....	1.60	7.70	63.76	65.70	242	12	1,039	43	7	2

The total monthly incidence of malaria among employees for Natal and Transvaal since 1932 to May, 1936, is shown in the following table:—

RECORD OF NUMBER OF MEN BOOKED OFF DUTY WITH MALARIA.

Year.	Month.	Number on North Coast.	Number on South Coast.	Number in Natal Inland.	Number in Transvaal.	Total Number.
1932..	January.....	4	11	3	24	42
	February.....	10	4	1	22	37
	March.....	9	6	1	21	37
	April.....	41	14	11	40	106
	May.....	109	45	41	31	226
	June.....	86	52	45	21	204
	July.....	66	24	14	7	111
	August.....	23	6	11	3	43
	September.....	10	7	13	4	34
	October.....	27	8	19	2	56
	November.....	13	9	10	21	53
	December.....	13	37	19	3	72
		411	223	188	199	1,021
1933..	January.....	2	4	13	6	25
	February.....	5	2	22	7	36
	March.....	10	1	32	18	61
	April.....	7	—	25	6	38
	May.....	3	1	15	8	27
	June.....	3	2	19	5	29
	July.....	—	—	5	3	8
	August.....	—	—	16	1	17
	September.....	—	—	8	2	10
	October.....	4	—	7	—	11
	November.....	—	—	8	—	8
	December.....	7	—	4	8	19
		41	10	174	64	289
1934..	January.....	1	—	7	13	21
	February.....	3	—	6	19	28
	March.....	6	—	8	14	28
	April.....	9	—	17	8	34
	May.....	5	—	26	5	36
	June.....	9	—	20	2	31
	July.....	5	—	22	6	33
	August.....	3	—	4	3	10
	September.....	—	—	5	2	7
	October.....	1	—	4	1	6
	November.....	—	—	4	2	6
	December.....	2	—	4	5	11
*		44	—	127	80	251
1935.	January.....	1	—	5	5	11
	February.....	2	—	4	8	14
	March.....	1	1	2	11	15
	April.....	1	—	2	8	11
	May.....	—	—	3	1	4
	June.....	—	—	1	4	5
	July.....	2	—	—	4	6
	August.....	1	—	—	—	1
	September.....	1	—	1	1	3
	October.....	1	—	2	1	4
	November.....	2	—	3	3	8
	December.....	1	—	—	1	2
†		13	1	23	47	84
1936.	January.....	1	—	2	1	4
	February.....	2	—	4	7	13
	March.....	1	—	2	11	14
	April.....	2	—	5	23	30
	May.....	6	—	3	21	30
	June.....	—	—	2	11	13

HOUSING.

Whilst the important phase of housing for departmental staff receives the constant attention of the field staff, particularly from the point of view of maintenance of hygienic conditions, a vast responsibility in the question of the shortage of housing accommodation generally throughout the Union is one which is under consideration by the Departmental Housing Committee.

\* Cases for seasonal year 1934–1935 = 133.

† Cases for seasonal year 1935–1936 = 128.



In so far as this aspect is concerned, therefore, a great deal of information will be available when the committee's report is published. The shortage more particularly evident, is in respect of houses for the large number of European non-graded staff, and is so general and acute that it can only be briefly referred to in the compass of this report. The conditions under which these members of the staff are living in some of the larger centres where insufficient housing for poorer European inhabitants exists, has been found to be appalling. In many instances these people have had to take refuge under extremely unhygienic conditions in outbuildings in the yards of Asiatic dealers and such like premises.

Although this problem is being actively dealt with by a number of local authorities under the Housing Act, and in the near future—by means of economic loans—provision for such residents will be made, the number of such active schemes are small in proportion to the needs.

On its part the Administration (which for obvious reasons cannot undertake the responsibility of providing housing for members of its staff where an urban local authority exists) is spending a vast amount annually on housing for its employees in outside or rural areas. For the permanent staff such accommodation is at the outset completely satisfactory. It is only to be understood, however, that for temporary labour, structures are not all that might be desired. With experience, however, even for temporary work, portable quarters are being evolved that at least meet with main hygienic conditions.

In the main the activities of the health staff are directed towards the prevention of conditions on railway premises of which the following are examples:—

- (1) European labourers, living in native unlined wood and iron buildings, badly ventilated and unhygienic.
- (2) The use by families of malthoid huts provided to accommodate single men.
- (3) The erection by labourers of their own houses, which in many instances are worse than native habitations.
- (4) Over-crowding, the use of sleeping accommodation by both sexes, and the lack of washing and cooking facilities.
- (5) The choice of unsuitable siting for new houses.

The standards imposed under the Slums Act are religiously taken as a guide by the health staff in recommending improvements or demolitions to the System Engineer or Works Inspector.

The following table shows the housing position on six of the nine Systems:—

Material.		Cape Western.	Cape Northern.	Orange Free State.	Eastern Transvaal.	Western Transvaal.	Natal.
Brick .....	Fit..	1,483	420	723	1,054	1,241	1,023
	Unfit	8	15	23	—	—	—
Stone .....	Fit..	180	55	240	127	118	38
	Unfit	11	4	17	—	—	—
Concrete .....	Fit..	7	—	—	—	—	—
	Unfit	—	—	—	—	—	—
Wood and Iron (Brick Lined)	Fit..	71	8	130	249	46	22
	Unfit	—	—	12	—	—	—
Wood and Iron (Wood Lined)	Fit..	394	156	425	163	384	682
	Unfit	63	70	157	31	22	82
Wood and Iron (Unlined)	Fit..	—	—	—	—	—	—
	Unfit	104	—	—	11	—	—
Wood .....	Fit..	—	—	—	—	—	—
	Unfit	17	3	8	—	2	—
TOTAL .....	Fit..	2,135	639	1,518	1,593	1,789	1,765
	Unfit	204	92	224	42	24	90

As will be observed, the standard of houses that are constructed of permanent materials is almost 100 per cent. satisfactory. Wood and iron and other temporary structures in the larger centres and those where the Slums Act applies, are giving way to permanent houses. Where, however, such buildings are situated in rural areas, with suitable siting, and their condition permits of adaptation to permanency demolition would be entirely uneconomical. In many instances such quarters have been rendered entirely

habitable by the provision of brick lining and/or brick jacketing. As will be observed some hundreds of houses are at present of wood and iron, wood lined, and the majority of these will be either weeded out altogether, or be rendered more habitable by the abovementioned process, during the next few years.

There are many other houses on the Cape Western which are for the most part self-built wattle and daub huts erected by coloured labourers. This problem is found particularly in the Cape Systems and is receiving consideration.

At Touws River demolition work on 27 wood and iron structures has commenced.

At Beaufort West, Cape, two blocks of back to back coloured quarters have been condemned and are to be suitably altered. At Capetown, a survey under the Slums Act by the local authority of Government property including railway housing, will shortly be commenced.

At Pretoria extensive alterations have been sanctioned to houses in the railway camp, including the provision of native rooms, bathrooms, improved lighting and ventilation and paving of back yards. At Waterval Boven some eighteen houses are in course of construction and a further eighteen have been agreed to. At Komatipoort some eleven houses have been agreed to. At Kaapmuiden three quarters have been built. Some 79 quarters have been erected at isolated points in the Eastern Transvaal during the year. Altogether some £100,000 is being spent on housing on this System alone, this financial year.

On the Western Transvaal a large housing programme is in hand. At Germiston the well-known "Tin Town" has been demolished and 55 detached labourers' quarters, in brick, have been erected, readily accessible to the station. At Langlaagte a further 34 houses have been constructed to replace the demolished houses at Braamfontein, and single houses totalling approximately 40 have been erected throughout this System. Housing shortage on the two Transvaal Systems is still acute.

In the Orange Free State, Bloemfontein is the only centre where the Slums Act applies. Here 32 houses are being demolished and will be replaced by the same number of permanent structures. A tremendous shortage of cheaper housing exists in the local authority's area at this centre, where the need is very great. So far no attempt has been made to improve this position.

In Natal the housing position is not so acute. During the sugar season on this System and the fruit season at certain other centres in the Union, periods of temporary acuteness occur, but it is usually possible to accommodate the extra staff by boarding single men with the permanent staff or accommodating them in portable hutments.

Two very large schemes for native and coloured labourers are in course of completion at Naauwpoort and Rosmead respectively.

In summing up the housing position it is evident—

- (1) that almost all railway quarters of permanent material are in first class condition;
- (2) the majority of the remainder are either in course of demolition or will be adapted for permanent habitation within the next few years;
- (3) the Department is expending a very large amount in meeting the shortage of adequate housing in rural and isolated areas;
- (4) the shortage of cheaper and adequate accommodation for members of the staff in urban areas for which the support of local authorities is expected, is still very acute.

#### INFECTIOUS DISEASES.

Some outline of the organisation for this phase of preventive work has been given under a previous section. The arrangement arrived at with the Sick Fund organisation to report to Systems and this office, all cases of notifiable infectious diseases has only been in operation some two months. Apart, however, from statistical information which will be derived from this source and applied to the improvement of living conditions, the men in the field have already assumed the more definite control of morbid conditions brought to light as the result of advices of notifiable diseases. In the course of time a greater measure of cohesion will exist between the railway medical officers, who are *ex-officio*, medical officers of health for their railway areas, and the field staff who are there to assist them in this particular sphere and to bring about an improved standard of hygiene.



During the year only two major epidemics occurred, both being enteric fever. One, during the months October, November and December occurred at Glencoe, Natal. This is an important railway centre, with approximately 1,000 men and their dependents, the majority of whom reside within the area of the Glencoe Local Authority. Investigations were carried out in December by the Union Health Department in which this Department's Health Inspector assisted. There is not much doubt that the outbreak which involved some twenty members of the staff and their dependents gained such a strong hold, by reason of the absence of control of sanitation and of the sale of perishable foodstuffs, and the disposal of waste matter in the town area, there being no qualified local health inspector at that time. Owing to the general and widespread nature of the outbreak, arrangements were made by this office with the Railway medical officer, for oral vaccine to be administered to all Railway staff and their dependents at the depot, and only one case occurred thereafter. It is considered that in saving hospital expenditure alone this measure paid for itself. The system of advising this organisation of infectious disease was then not in practice, and this outbreak had become prolonged and acute before measures could be taken.

The other major outbreak was at Beaufort West, Cape. A total of twenty-five cases occurred throughout the months of March, April and May. Suspicion was directed to the fact that a number of these, who were school children, were in the habit of drinking water from furrows and a number attended a large picnic. Samples taken from the water supplies at both the town and railway sources proved to be satisfactory. Sanitation generally is considered to be lax in the town itself and until the general standard is improved such outbreaks which at present temporarily end with the seasonal rains, are likely to be a yearly occurrence.

The chief infectious diseases met within the Cape are the enteric group and tuberculosis, the latter being rife among the coloured employees. Flies are a particular menace on this System and it is considered, are responsible for a good deal of existing gastro-intestinal disorders.

In the Transvaal sporadic cases of enteric have occurred chiefly in houses of those by whom sanitation and hygiene are not very well observed.

At Vrede, Western Transvaal, a human case of anthrax occurred, suspicion being directed to consignments of hides and skins handled by a labourer who afterwards died. It was clear from this case that outbreaks in rural areas are oftentimes allowed to go unnoticed and it is significant that the veterinary authorities have now adopted an improved method of notification between that Department and the Union Health Department.

In the case under notice all contact trucks were traced, a matter involving considerable work. These were brought to a standstill and each truck and its contents, goods-shed and tranship station where suspected skins and hides were handled were disinfected by members of the health staff. Contact vehicles were discovered and treated at Durban, Verulam, Ladysmith, Greytown, Standerton, Karino, Germiston and Bushmans River.

Among others some eight or ten children of railway employees at Piet Retief were ascertained by the Transvaal Bilharzia Organisation to be suffering from bilharzia and by arrangement with the Railway Medical Officer were given treatment.

*Carriers of Infectious Disease.*—In continuation of the policy formulated last financial year all entrants to the catering service are subjected to exhaustive medical tests with a view to the exclusion of carriers in those engaged in this branch of the service. Men already in this branch reporting ill of infectious diseases are not allowed to resume duty until laboratory tests prove that they are free from infection.

A proposal to form a training centre exclusively for coloured catering employees, chiefly members of the beddingstaff is now in hand. The intention is to accept only perfectly healthy individuals for this work, who at the time of recruitment would be subjected to blood and sputum tests for venereal disease, enteric and tuberculosis, in addition to the ordinary medical and eyesight examination. These men will be trained in the principles of hygiene, in addition to the various matters of routine and courtesy expected of these members of the staff.

#### DOMESTIC WATER SUPPLIES.

The responsibility with which the Administration is faced in providing an adequate and wholesome supply of domestic water to its hundreds of servants and to the travelling public on ships, coaching stock and dining-cars, is no mean one. With an Administration of such vast dimensions as the South African Railways it is to be expected, that, in endeavouring to provide domestic water which is above suspicion, many problems are encountered. The problems met with are peculiar to the working of the railways and since there are about 2,000 independent water supplies derived



from all possible varieties of sources, each one in itself a potentially contaminated source, it can be fully appreciated that the Administration has to contend with many. The risk of contamination is greater or lesser according to the source from which the water is obtained and the method of storage and delivery employed. Also the chances of polluting an otherwise pure supply are tremendously increased when much handling of water is involved such as filling underframe carriage tanks, corridor filters, dining-cars and wayside tanks.

All these points have to be diligently watched, for a faulty supply may not only be the cause of seriously affecting the health of the Administration's servants, but may disorganise the service. Apart from this the travelling public have to be considered in the light that an outbreak of any water-borne disease traced to a faulty train supply may involve the Administration in adverse criticism and possible claim besides seriously affecting the goodwill of the South African Railways.

The sources from which the Administration derives its water supplies can conveniently be divided into four groups, viz:—

- (1) Deep springs and boreholes.
- (2) Shallow wells.
- (3) Surface supplies, i.e. dams, rivers, furrows, etc.
- (4) Municipal supplies.

Water supplies are regularly sampled by members of the field staff and whenever a particular sample shows signs of contamination a recheck sample is taken to confirm contamination or otherwise. During the period under review 34·1 per cent. of the total number of supplies has been examined, wayside tanks not being included in this figure.

Excluding the Cape Midland and Cape Eastern Systems, for which accurate figures are not yet available, there are 1,561 independent water supplies, including wayside tanks, throughout the Union.

The following table shows the number and nature of water supplies on each System:—

System.	Total No. of Supplies.	Springs and Boreholes.	Wells.	Surface Supplies.	Wayside Tanks.	Municipal.
Cape Western.....	364	94	51	9	129	81
Cape Northern.....	122	35	27	11	43	6
Orange Free State.....	189	115	25	7	19	23
Natal.....	271	56	10	78	75	52
Western Transvaal.....	204	96	22	7	14	65
Eastern Transvaal.....	264	117	41	24	63	19
South-West Africa.....	147	36	13	15	75	8
TOTAL.....	1,561	549	189	151	418	254

During the year, 390 independent supplies were examined and 632 bacteriological analyses were made by the Railway Laboratory, Salt River. The results of the examinations are shown in the following table:—

#### RESULT OF WATER ANALYSES.

System.	No. of Supplies Examined.	No. of Samples Examined.	Pure.	Contaminated.	Suspicious.	Inconclusive.
Cape Western.....	77	156	90	25	41	—
Cape Northern.....	30	40	24	6	3	7
Cape Midland.....	14	17	12	3	2	—
Cape Eastern.....	60	88	61	11	14	2
Orange Free State.....	25	29	21	5	3	—
Natal.....	46	49	26	11	11	1
Western Transvaal.....	75	118	77	19	20	2
Eastern Transvaal.....	38	95	59	21	12	3
South West Africa.....	25	40	21	3	16	—
TOTAL.....	390	632	391	104	122	15
	—	—	61·8%	16·4%	19·3%	2·3%

System offices are advised direct by the Laboratory of the results of all water samples taken and it is the practice at all centres where contaminated



or suspected supplies are in use for the resident staff to be warned immediately to boil drinking-water as a preliminary to the improvement or protection of the local supply. Enamelled warning boards are prominently displayed on stations adjacent to taps of engine and other non-domestic supplies.

The percentage figures at the foot of the foregoing table are based on the results of samples taken and not on the number of supplies. They are, therefore, intended as a guide only. Although the survey is far from complete, it is possible at this stage to estimate fairly accurately the percentage of pollution likely to be found in supplies not yet tested.

From results to hand the smallest percentage of pollution is found to occur in boreholes and springs—9·13 per cent. only of which show contamination. The percentage of pollution in other sources were:—

Wells ... ..	36·6%
Surface supplies ... ..	39·2%
Wayside tanks ... ..	15·7%
Municipal supplies ... ..	12·5%

It will be observed that next to boreholes municipal supplies have shown the highest percentage of purity. Owing to the high percentage of contamination found in surface supplies and wells, these should always be regarded with suspicion. Unless definite provision is being made to treat such water before being used for domestic purposes, these two sources of supply should be avoided where possible.

Too much reliance cannot be placed upon the results of samples taken from wayside tanks since only a low percentage of the total number of tanks was sampled. This method of providing water is to a great extent open to pollution, for diverse reasons, chiefly due to—

- (1) the great amount of handling involved;
- (2) chutes used for filling tanks are not properly handled and cared for;
- (3) in most cases no taps or hand pumps are provided and the only possible method of withdrawing water is by dipping for it;
- (4) no proper covers for tanks are provided, resulting in surface pollution.

Improvements to tank supplies have been effected on most Systems and although an improved tank has been designed with a silt sump, proper cover and withdrawing facilities, a great deal of improvement still remains to be done in other directions to render these supplies satisfactory.

The general question of the purity of water supplies is still far from satisfactory but it is pleasing to note that a large number of improvements for the protection and purification of domestic supplies have been carried out throughout the Union during the past year.

Almost all railway domestic water supplies are required for a small daily consumption and the difficulty is to obtain a sterile water economically owing to the fact that even the smallest automatic chlorinator is designed to cope with a consumption far in excess of the needs of the average station. Hand-chlorination plants have been resorted to in a number of cases but owing to the human element these do not give entire satisfaction. An automatic plant is in the course of construction which it is hoped will overcome in the near future the difficulty of efficiently and economically chlorinating small water supplies.

*Train Water Supplies.*—In view of the considerable amount of handling of water involved, corridor containers and kitchen supplies on long distance trains continue to receive attention over the whole Union. An improved type of nozzle shield for the hose used for filling underframe tanks of coaches has been devised.

A filter room at Braamfontein, for the hygienic handling, cleaning and filling of glass water containers in coach corridors is nearing completion. When this is working satisfactorily similar rooms will be erected at all large coach depots. "Izal" sterilization of containers has been advocated, since this disinfectant is non-toxic, efficient and cheap. It was at first intended to sterilize by steam but as the result of experiments this method was found to be uneconomical due to the high percentage of breakages. To further reduce handling, experiments are being undertaken with specially devised wheeled crates for carrying filled water containers from filter room to coach.

Particular care must be exercised in the filling of dining-car underframe tanks, as these (unlike passenger coach underframe tanks) contain the water used for culinary and drinking purposes. Absolute sterility is aimed at and experiments have shown that this can satisfactorily be obtained by the introduction of Chloramine T, whenever tanks are filled. Chief stewards of all



dining-cars have been provided with Chloramine T in powder form for this purpose and instructed in its use. The foregoing serves to indicate that the Administration is alive to its responsibility for providing a safe drinking water on trains in the interests of the travelling public.

### FUMIGATION OF QUARTERS.

The work of fumigating quarters (chiefly for bugs) has been carried out in various ways on each System. At the larger depots it was undertaken either by men graded as fumigators in which event each man had a large section to cover or in some cases by private contractors. In the more isolated places fumigation was done by painters, carpenters, plumbers, or carriage and wagon examiners in a part-time capacity. In all cases supervision was given by the Works Inspector.

By reason of a more exact knowledge of infection, the life history and habits of domestic pests, specificity, exposure and dosage of lethal agents, the health staff is in a better position to deal economically and effectively with disinfection and disinfestation of departmental quarters and the work, therefore, falls legitimately within the scope of the health organisation. Although a certain amount of fumigation and disinfection was done on each System as the various units became competent, the suggestion for its general adoption on Systems where the organisation was complete was put forward this year. The change over is rapidly being brought into effect but on some Systems the arrangements have been deferred pending their completion.

As an illustration of the saving in costs likely to accrue as a direct result of this work being assumed by this organisation it has been ascertained from reliable figures that the total number of fumigations on the Transvaal Western, Cape Western and Orange Free State Systems, amount to 277 per annum at a cost of £1,425 or approximately £5 per fumigation. Carried out under the health organisation the same work will cost approximately £346 inclusive of wages and material.

The policy adopted briefly is to pass out all health foremen as fumigators and for each to do the necessary work on his section under the instructions of the health inspector thus saving time in sending a man from one end of the system to another. Such practices as the employment of cyanide where disinfection is required have been discontinued, also double fumigation to kill eggs and winter fumigation when insects are hibernating and are less vulnerable have been suspended.

As hydrocyanic acid gas is the lethal agent in all cyanide processes, the pot method using sodium cyanide and dilute sulphuric acid was selected for routine work on account of its cheapness. For a trained staff there appears to be no outstanding advantage in any of the more expensive patent forms of the gas. These remarks do not apply to all disinfestations as it is realised that in the fumigation of coaching stock, for instance, powder has certain advantages over the pot method.

There appears to be a rapid increase in the number of spray insecticides on the market each with its own extravagant claims. A number of these were tested under laboratory and field conditions during the year. For effectiveness they all depend on direct contact with vermin and are consequently unreliable. Where the use of cyanide is not expedient, a number of effective disinfestations were made with liquid.

A difficulty that has been experienced is that legislation in the Union does not provide for the compulsory licensing or certification of a fumigator working with dangerous material. It is true that most of the towns include such a provision under their by-laws which are restricted to their own areas, but our staff have to work in most instances immediately adjacent to premises which are under the jurisdiction of a local authority by whom our men are not licensed. As a result it has been the practice to pass the railway staff through a rigorous test in fumigation methods and precautions by their inspector and thereafter by arrangement with the local authority of an important town nearest the System Headquarters each man is examined by these authorities and issued with a gratis licence. Whilst this does not entirely overcome any objections that may be raised by an outside or minor local authority on the score that men are undertaking fumigation of buildings unlicensed for their own area, the practice is intended as an indication that our men are at least technically efficient in the eyes of one reputable municipality, and so far no objections have been raised.

In accordance with the foregoing, three men on the Western Transvaal have been passed out by the Johannesburg Municipality. Three in Natal have been rigorously examined and passed, two in the Orange Free State and two on the Cape Northern System.

Fumigation of all quarters has for some four months been undertaken by the health staff on the Orange Free State, Cape Northern, Cape Midland and Natal Systems. On the Cape Eastern and South West African Systems



the work is done by the health staff, but in the absence of an inspector the work is controlled by works inspectors at present, and this organisation's policy does not yet apply. In the two Transvaal Systems arrangements are in hand for this work to be handed over in the near future to the health staff. It is hoped that the Cape Western System will fall into line in this respect during the coming year.

The following fumigations were carried out during the four months on the Systems indicated:—

Method of Fumigation.	Cape Northern.	Orange Free State.	Natal.
H.C.N. "Pot method".....	5	6	82
Cyanogas Vermin only.....	—	—	2
Disinfestation with Paraffin Emulsion.....	—	—	7
Disinfestation with Formalin for Infectious Diseases, etc.	—	—	43
TOTAL.....	5	6	134

In all of these cases the costs worked out at between 25s. and 30s. per average sized house which is considerably less than the amount usually estimated for on the Railways.

As might be expected, experience shows that the heaviest incidence of bug infestation is found in native quarters and in the dwellings of the poorer classes. Although this fact is fully appreciated very little is done to reduce the recurrent costs of fumigation by minimising the harbourage in such habitations. On the contrary the majority of dwellings intended for the less enlightened members of the community are more susceptible to this fault than those inhabited by members who are in a better position to protect themselves from the scourge.

#### GENERAL SANITATION AND HYGIENE.

##### "TYPE" DESIGNS FOR SEPTIC TANKS AND SOAKAGE PITS.

The possibilities of up-to-date and hygienic comfort following upon the use of the septic tank method of waste disposal has been very little explored on the Railways in spite of the fact that sufficient land and water is in many cases available. With a view to the more extensive use of this method of disposal, considerable time has been spent during the year to design a suitable unit to meet standard needs. In this connection the aims were to devise a tank that may be adapted by means of an accompanying table, to meet the needs of any size of community from 5 persons to 100 persons, and to be as simple and cheap in design as possible. In collaboration with the Railway architect a final design was agreed upon and a type drawing has been issued to all Systems. Finally, in view of the reasonable cost of septic tank installations and their cheapness of maintenance compared with conservancy methods of disposal, system engineers have been requested to extend their use at stations and depots wherever such a course is practicable.

In certain sections of the country provision for the disposal of household slopwater at staff quarters has been entirely omitted for the reason that french drainage is unsuitable to the local soil. The results of such neglect may well be imagined. It has been found that the non-success of these installations has been rather more due to incorrect methods of construction, e.g., the inclination to construct the pit type of drain in which the sub-soil is almost non-porous and the water concentrated on too small a disposal surface. A type drawing for French drainage also has been issued and circulated to all Systems. The advantage of the type selected is briefly that its absorption surface is confined to the first two feet of the earth's surface as its section is only 18 in. by 18 in. Thus disposal is very readily carried out by soakage into the most porous layer of the soil and is assisted at this depth by surface evaporation. Capacity can be increased at will by extending the length, and can be stimulated by tree-growing.

The following details are reported in respect of hygiene and sanitation routine throughout the Systems. The relative statistical matter will be found in respect of each at the conclusion of this section.

##### EASTERN AND WESTERN TRANSVAAL.

(Health Inspector E. Botha.)

##### WESTERN TRANSVAAL.

(Assistant Health Inspector T. L. Peagam.)

Prompted by the realisation that owing to the large amount of new work, works inspectors are unable to give the necessary attention to works which are vitally important to the improvement of living conditions, a



proposal has been put forward to form the health organisation into a self-contained unit. Some of the phases it is hoped to embrace under this scheme are the construction of french drains and the complete control of the disposal of all waste matter. At present the former programme is very much behind hand. On the Eastern Section a full-time man is now engaged upon the construction of french drains but the work of connecting up, which is carried out by a bricklayer is often held up owing to a shortage of labour. The position with regard to night-soil disposal is still far from satisfactory. Before the formation of the health organisation it was impossible to give this wide subject specialised attention and as a result the general dictum obtained that where a local authority was available the service should be performed by it at its recognised rates. Where such was absent the Department granted the payment of a recognised monthly allowance to the station native to carry out burial. This service does not include the houses of European labourers, who are still responsible themselves for their own disposal duties, and is otherwise unsatisfactory. Along the large area of the Reef and adjacent lines it would be possible where local authorities do not exist to arrange for full-time natives with definite sections under the control of the health staff to do the work at less cost and to give greater satisfaction, than the present part-time method. An extension of the Otway pit system for the construction and maintenance of which the health staff would be responsible, is in view.

Refuse disposal, where local authorities undertake the service, is satisfactorily performed. At outside stations, however, the emptying of bins is very irregularly done. This service could also be improved by the appointment of sanitary boys already mentioned.

Considerable nuisance arose from fly-breeding at the Kazerne truck-washing site, and owing to its proximity to the city area of Johannesburg, complaints were numerous and justified. Six fly-traps were installed and arrangements were made for the manure to be disposed of at more frequent intervals, and since this was done no further complaints have been received. A similar nuisance arose at Germiston to inhabitants of 50 new cottages erected by the Department for European labourer quarters. These are unfortunately located in the vicinity of a factory carrying on several offensive trades. Owing to the inefficient methods and inadequate precautions for avoiding nuisances the latter's licence was successfully objected to, pending improvements. As a temporary relief from the risk of fly-borne disease the occupants of the cottages were supplied with insecticide and spray guns at cost price.

#### RAND NEW WORKS.

The work that is at present under construction all along the Reef and to Pretoria, in connection with the lowering, doubling and straightening of lines, electrification and the building of new stations and quarters, is assuming vast proportions and in connection therewith problems of sanitation, housing, etc., have arisen. This is to be understood, since the number of non-European labourers employed on these works alone number close on 5,000.

Most of the natives were accommodated by the Administration. Two big temporary compounds have been built at Langlaagte and Wolhuter, smaller ones have been erected near Eloff Street Extension crossing, and at different points along the Germiston-Pretoria line. The whole question was thoroughly investigated by the health inspectors in company with the engineer-in-charge, to whom the necessary recommendations were made on the spot, and these are being carried into effect. The following recommendations were put forward:—

- (1) The appointment of a health foreman for ensuring regular and adequate supervision of all encampments along the line.
- (2) Provision of adequate sanitary conveniences for natives and European labourers on the work. Fly-proof pit privies outside municipal areas.
- (3) Provision of suitable shelters for cooking purposes.
- (4) The bigger compounds to be provided with steam disinfectors, plans of which have been forwarded to the district engineer. Bunks in compounds to be raised at least 18 inches from the ground to facilitate cleaning.
- (5) Provision of adequate personal and domestic washing facilities.
- (6) Issue of an improved ration scale for native labourers of 4,000 calories per diem.



## EASTERN TRANSVAAL.

With the general absence of clayish soils slopwater disposal on this System is not an acute problem. Whilst the malarious areas, however, are well catered for as regards slop-water disposal there is much room for improvement on the high veld and it is hoped that arrangements for the installation of french drainage will be undertaken as a general principle in the near future.

Practically the same unsatisfactory conditions as are experienced on the Western Transvaal System are encountered on this System as regards the disposal of waste matter.

Reference to the next table will show that some 908 sanitary services are carried out by local authorities on this System as against 543 by the Administration and 184 by occupants. Very few large centres where the services can be handed over to local authorities are encountered on this system. At the centres of importance, e.g. Pretoria, Witbank, Nelspruit, Rustenburg and Breyten stations and quarters are serviced by the local authorities.

## KOMATIPOORT.

This is almost exclusively a railway centre and with a mixed population of approximately 150 Europeans and non-Europeans, and where climatic conditions are perennially difficult it requires a constant supervision for health and hygiene. Previously the Department has employed a squad ganger in a temporary capacity at this centre to undertake malaria permanent works.

The Department has now recognised the importance of employing a regular man on all phases of health work here and has agreed to the appointment of a health foreman at this centre. Anti-malaria work will continue to be performed but with the extension of this employee's authority to all phases of sanitation over the whole camp a general improvement in conditions will undoubtedly follow. The Department is already in receipt of a substantial amount monthly from the Agricultural Department as a contribution to its interest in health supervision at this centre which is at present being paid to a local officer as an allowance. This will now be diverted to departmental funds.

## WATERVAL BOVEN.

As one of the largest purely Railway camps in the Union with a population of over 2,000, it is a matter for considerable surprise and dissatisfaction that it is practically the only one of its importance not possessing a health foreman or camp overseer of its own. Situate in the middle of a rural magisterial district no sanitary or health supervision other than that given by the Administration exists, and this under a gang of native employees can definitely be considered as being much below par. The only reason for such a position being at all tenable is no doubt due to the fact that a district engineer and Railway medical officer are resident actually in the camp, and can readily discuss camp affairs. Even so, problems of sanitation and food supplies are not being properly catered for. There are a good many reasons to justify the appointment of a trained sanitarian at this camp, not the least of these being meat, food and milk examination and the conditions of their sale which at present are subject to no authority whatever.

I make no apology for reference to malaria in this section of the report. The beginning of the low veld, where malaria control proper commences, is at Waterval Onder, altitude 4,144 feet. From here the country gradually decreases in altitude and increases in malariousness to Portuguese territory and the presence of the malaria staff is more urgently required the farther east from Waterval Onder one travels. Waterval Boven, with an altitude of 4,826 feet, is a tortuous climb over 9 miles of line west from Waterval Onder, difficult and inconvenient of attendance for the malaria foreman in relation to the other parts of this section. Yet Waterval Boven has a definite malaria problem and one furthermore much in excess of its apparent potentialities and higher altitude. In the absence of a trained health foreman for the camp proper, this problem cannot be given the further consideration it undoubtedly warrants and will be likely to continue under present circumstances.

## CAPE WESTERN.

(Health Inspector F. G. C. Watermeyer.)

Sanitation problems on this System are chiefly those of obtaining satisfactory disposal of waste matter at outside stations with the security of water supplies always in view, the maintenance of cleanliness and good sanitation on the Peninsular Suburban Area and an adequate cleansing and inspection



service at the three large camps, Touws River, Beaufort West and Hutchinson. At two of the three centres resident health staff attend to the full sanitation service whilst in addition daily meat and food inspections continue to be maintained at Touws River. At this centre also a survey of the camp has been made and it is anticipated that work will be commenced at an early date to instal a complete water-borne sewerage system. If the water question can be satisfactorily settled a similar scheme will no doubt be embarked upon at Beaufort West. In this connection it is stated that the Administration already has a lease over a suitable piece of land for the disposal of effluent in the vicinity of the camp.

A certain difficulty is being experienced as a result of a shortage of labour for night-soil disposal work. A comprehensive scheme providing for a complete service of travelling sanitary labourers for the whole system is awaiting approval. This is intended to give a minimum of a bi-weekly service for every station.

At several centres arrangements are being made for the early installation of Otway pits, notably at De Wet, Prince Alfred Hamlet and Vredenburg. An improved type of pit latrine is being installed at outlying cottages. As will be observed the majority of these services are by the pail system, carried out by the Administration.

Drainage in the Karroo areas presents a special problem where the disposal of slop-water is concerned, owing to the absence of porous soils and to the danger of fouling underground water supplies along lines of fissures in the rock strata. The practice of allowing rain water and storm water to enter french drains through open channels has caused considerable dislocation.

A large percentage of houses have no provision for the disposal of household refuse and owing to the untidy habits of the coloured people who form the vast majority of railway labourers on this System some trouble is experienced in inculcating clean habits into their minds.

A very successful means of rubbish disposal has been secured by the use of Murray's portable incinerator. Five of these have been introduced at different places to deal with paper and putrescible matter, all tins being flattened and buried with the ash, resulting in disposal sites entirely free from fly-breeding and other nuisance.

Complaints were received from the local authority at a Capetown suburban station of the tremendous nuisance caused by fly-breeding in rail-borne manure traffic. This traffic is perennial and constant at Plumstead as a convenient depot for delivery to the farmers in this part of the Peninsula. Investigations proved that of a total of 267 trucks received there over six months no less than 240, or 90 per cent., of these were loaded at stations within the Capetown Local Authority area. As the Administration is practically unable to apply any restrictions regarding the acceptance of unfermented manure, the matter was referred to the Local Authority itself, with a view to some form of control being applied to senders of this traffic. It would be quite out of the question for the Administration to set up a precedent by providing fly-proof storage at the receiving stations, and other methods of fly control of a temporary nature failed in this instance.

#### CAPE MIDLAND.

(Assistant Health Inspector C. J. Schmidt.)

A systematic inspection of the stations on this System during the year revealed such a looseness of sanitation routine generally and such a large number of conditions which necessitated immediate improvement and supervision that the System Manager was approached with the suggestion that a learner health foreman be appointed at Naauwpoort to allow Assistant Health Inspector Schmidt, who has had many years of experience as a sanitarian at that centre, to supervise the work over the whole system. This was agreed to in February but sufficient time has not elapsed to permit of the whole programme being tackled. A complete inspection of all sections has, however, been made and reported on and most stations have been improved. Impervious floors have replaced earth floors in most lavatories, double sets of pails have been introduced at most stations. At many stations general cleanups have been effected as the result of outbreaks of infectious disease. Close attention has been paid to questionable water supplies and to food stores serving employees and the whole standard of hygiene has been raised on this System.

The new housing scheme for natives and coloured workers, now under construction at Naauwpoort, include a disinfecting plant and washing facilities. A comprehensive underground system of waste water disposal for European quarters is under construction.



## ORANGE FREE STATE AND CAPE NORTHERN.

(Health Inspector H. H. de Beer.)

With the exception of a few large areas, e.g., Bloemfontein, Kroonstad and Kimberley, the majority of the stations on these Systems are small and isolated. The conservancy system of night-soil obtains largely and disposal is by means of trenching and Otway pits. Considerable improvement to provide against irregularities has been effected during the year.

The health staff has commenced to take over all sanitation including fumigation, construction of and repairs to french drains, and Otway pits.

The health inspector reports that on the Orange Free State System during the year 136 cement floors were put in, leaving only 61 lavatories with earthen floors. 109 additional lavatories were built and 10 Otway pits installed. Improvements for waste water include six french drains and the Bethlehem scheme which is nearing completion. A complete waterborne sewerage system has been agreed upon for Kroonstad camp and will be shortly commenced.

On the Cape Northern System camp sanitation was satisfactorily maintained by the camp overseer at the large De Aar camp. During the year four French drains were built and five complete drainage schemes were completed on the System. Six cement lavatory floors were installed.

A large number of improvements will be commenced when the principle of complete control of the health staff and provision of a rough carpenter on the System have been approved.

The health inspector in control of both the Orange Free State and Cape Northern Systems is stationed at Bloemfontein, but there are strong indications that it will be necessary to appoint an assistant health inspector at Kimberley to take control of the Cape Northern in order that the organisation on the latter System can be of full effect. This course was adopted with great success on the Western Transvaal early in 1936. This System is the only one in the Union now unprovided for as regards independent supervision and the exception is becoming more noticeable as time goes on.

## NATAL.

(Assistant Health Inspector J. J. Grieve.)

Being an intensely populated System and one with a large area supporting holiday resorts, cleanliness and general sanitation are matters requiring constant supervision. Night-soil disposal methods have been improved at 52 stations including the provision of three Otway pits. A large number of quarters is still unprovided for regarding waste water disposal but improved methods have been introduced at 10 quarters. Twenty-one incinerators are in use for rubbish on the System. A refuse disposal system is in practice at all stations.

## DURBAN WORKSHOPS.

The sanitary gang established last year to cope with the deplorable state of sanitation then existing in the workshops, Durban, has, to date, fully justified its introduction.

Composed of a health foreman and a gang of 15 natives and Indians, it carries out all sanitation duties in the mechanical engineer's shops and yards, the road motor transport shops and yards and the running sheds at Greyville. The duties of this gang are mainly as follows:—

- (1) Maintenance of general cleanliness, collection and disposal of litter, etc., in the shops and yards.
- (2) Latrines, daily cleansing and disinfection and periodical lime-washing.
- (3) Regular weekly disinfection and flushing of all sumps and drains and minor repairs to same.
- (4) Periodical cleaning of windows and roof gutters.
- (5) Rodent and vermin destruction.

All work carried out is regularly inspected by the Health Inspector, Durban.

Improvements effected during the year:—

- (1) Wyandotte boiling-tanks have now been set on a concrete base suitably and properly drained.
- (2) Shop 5.—Three skylights have been put in the roof and also three windows; repairs to the side walls have been carried out and suitable drainage applied.
- (3) Shop 9 (Brass foundry).—Fourteen fanlights have been replaced.



(4) Springshop.—The north wall has been removed giving better lighting.

Interest in and appreciation of the work of this gang is evinced by the number of complaints sent to the foreman for attention. 37 complaints in all were received. The foreman destroyed 121 rodents during the year.

#### MODEL VILLAGES.

During the year the Model Village (Arbeidslus) at Ingogo was enlarged and the total population has increased from 550 at the end of the year to 857.

In connection with the same construction works, i.e. Glencoe-Volksrust Improvements, a further village named "Werkgenot" on identical lines to Arbeidslus was erected twelve miles distant, near Mount Prospect Station. The number of inhabitants of this village is 1,122.

During the year 35 births and 14 deaths were reported at "Arbeidslus" and 38 births and 11 deaths at "Werkgenot".

The general state of health has been good. During August and September there was a mild influenza epidemic with no complications. Sporadic cases of mumps, german measles, and whooping cough occurred in school children. A visitation of measles during October and November attacked most of the non-immune children.

In "Arbeidslus" three cases of diphtheria occurred, one case of scarlet fever, and one of erysipelas. One child suffering from diphtheria died in hospital after tracheotomy. In "Werkgenot" two cases of diphtheria occurred, one being fatal. No cases of enteric fever, tuberculosis or venereal disease occurred.

Sources of food and milk supply are periodically examined. The milk supply was discontinued from one farm where a case of enteric appeared. The present milk supply from two progressive farms is collected and delivered under hygienic conditions.

The local slaughter-house was closed down on account of its proximity to dwelling-houses and a new one erected on a suitable site.

Water supplies at both villages are derived from surface springs with storage tanks and gravitating pipe distribution to each house, and test samples are taken weekly. Until midsummer of last year when the dry weather conditions necessitated the augmentation of the supplies from another source, water remained consistently pure with *B. Coli* absent in 10 c.c. Owing, however, to surface pollution it was necessary to carry out chlorination at the storage point. Owing to various factors results still showed that hand chlorination was very imperfectly carried out and in April last, as the consumption at "Arbeidslus" justified the course, a Patterson automatic chloronome was installed. At "Werkgenot" storage was rearranged and chlorination placed in the hands of the pumper. Since then samples have been 100 per cent. pure.

At "Werkgenot" village a part-time medical officer visits the surgery and inhabitants. During the year 9,000 visits were made. At "Arbeidslus" there is a resident full-time construction medical officer, who attends to outside camps on the construction.

At each village the full-time services of a qualified nurse are maintained and each is under a camp superintendent for discipline, health and social welfare.

With a view to avoiding the importation of infectious disease the policy has been adopted of medically examining all intending residents at the time of recruitment and again on their entrance into the villages. Personal effects are fumigated prior to the entrance of each inhabitant.

Non-infectious cases and surgical cases are hospitalised in the Newcastle hospital, but owing to the absence of infectious disease accommodation at this institution patients are isolated either at their houses or in separate accommodation at the village. In special cases they are conveyed by train to the nearest isolation hospital.

The villages have definitely served the two main objects for which they were intended, namely to provide a suitable labour force for the construction under amenable living conditions, and to improve the standard of life of those people and their dependents.

One point which I consider should definitely not be overlooked as regards the welfare side of model villages, however, is that if such a training is to be of maximum national effect, the principle of drafting out these employees to vacancies on open lines when they have received the benefit of the social education at the model villages, should now be seriously considered in order that these benefits may be made available to a far wider community of this type at present uncatered for. The opportunity for erecting such villages does not occur in every part of the country, and only by a system of drafting in and drafting out of inhabitants can the maximum benefit be obtained.



TABLE IV.—WASTE DISPOSAL SYSTEMS.

	NUMBER OF SEATS.					
	Cape Western.	Cape Northern.	Orange Free State.	Natal.	Western Transvaal.	Eastern Transvaal.
<b>LAVATORIES—</b>						
Waterborne System.....*	359	51	524	23	460	331
Septic Tank.....†	38	—	11	88	7	43
Patent Systems.....†	—	—	—	11	—	—
"    "    .....*	14	—	—	—	—	—
Vacuum Tanks.....*	—	—	—	—	52	—
Conservaney (Pail).....†	1,459	594	1,336	898	602	659
"    "    .....*	171	450	737	343	695	577
Pit Latrines.....†	—	—	109	465	3	25
No. of Otway Pits on System.....	—	—	10	3	—	—
<b>SLOPWATER—</b>						
Waterborne System.....†	76	—	—	—	—	—
"    "    .....*	225	48	408	84	455	290
Vacuum Tank.....*	—	—	13	—	11	—
French Drain.....	114	87	69	630	557	329
Portable Tank.....†	426	285	42	—	—	—
"    "    .....*	111	—	368	—	11	14
Discharge on Ground.....	862	179	504	799	499	480
Discharge into River.....	—	—	—	—	—	272
Not Catered for.....	329	221	385	—	280	250
NUMBER OF HOUSES.						
<b>HOUSEHOLD REFUSE—</b>						
Tipping.....†	351	409	643	1,317	No record	1,171
Local Authorities Removals	359	248	243	420	"	—
Incinerators.....	—	—	—	21	"	—
Burial.....	—	—	—	—	"	36
No System.....	1,729	74	849	—	"	428

\* Service performed by Local Authority.

† Service performed by Administration.

## KEEPING OF ANIMALS ON RAILWAY PROPERTY.

This is a matter which still presents great difficulty in control. It is realised that a cow is invaluable to the wage earner and the policy has been to educate the staff in keeping stables in a hygienic condition rather than to forbid the presence of such animals. As a means of assisting collection and removal of waste matter employees have been provided with manure drums. In spite of all efforts this matter still has to be given close and constant attention.

A different attitude is taken up with regard to the keeping of pigs, in view of the great nuisance created by these animals in relation to their value. Considerable opposition has been met with in the endeavour to get rid of them, but gradually their number is being diminished. As a subterfuge some employees have obtained the permission of owners of land adjoining Railway quarters upon which to let their forbidden animals run.

It is emphatically stated that there is no question of persecution of labourers and others in this measure and the co-operation of adjoining local authorities in control measures where requested, is earnestly enjoined. Unless employees will readily submit to the proper control of animal keeping in the interests of the community it will be necessary to inaugurate a rigid standard for housing and animal husbandry, which will involve owners in far more expense than otherwise obtains under present circumstances.

In the Karroo areas of the Cape many employees rely upon goats for their milk and meat and a proposal is being developed by one health inspector to ascertain the practicability of standard goat-kraals in stall form on a very cheap basis which could be erected at larger outside railway centres. Construction would be of concrete and jackal wire and stalls would be leased to the staff at a reasonable cost.

Some idea of the number of animals to be controlled throughout the Union is obtained from the following figures, in respect of animals kept by staff on the two Transvaal Systems.

Animal.	Eastern Transvaal.	Western Transvaal.
Cattle.....	249	881
Pigs.....	72	263
Goats.....	12	12
Horses.....	—	1
TOTAL.....	333	1,157
GRAND TOTAL.....	1,490	





ANNEXURE E.

VACCINATION OF INFANTS AND CHILDREN IN THE CLASSES OF THE POPULATION WHICH REGISTER BIRTHS, YEAR ENDED 30TH JUNE, 1936.  
(These figures do not include Re-vaccination of the 12-year old Children.)

Particulars.	Cape.		Transvaal.		Natal.			Orange Free State.	Union.
	Cape District.	Remainder of Province.	Rand Area.	Remainder of Province.	Durban.	Natal.			
						Pietermaritzburg.	Remainder of Province.		
Births Entered in Vaccination Register.....	13,741	38,692	12,343	11,231	2,496	707	1,676	4,888	85,774
Successfully Vaccinated.....	4,825	3,537	3,102	3,276	1,131	319	853	1,909	18,952
Insusceptible to Vaccination.....	2	28	140	144	65	19	30	57	485
Vaccination Postponed owing to Illness.....	153	187	750	948	338	90	278	633	3,377
Previously had Smallpox.....	—	—	—	—	—	—	—	—	—
Deaths of Infants under Two Years Registered.....	3,297	3,776	916	690	228	34	187	251	9,389
Exempted under Section 10, Act No. 15 of 1928.....	45	105	156	119	141	24	45	52	687
Ratio Percentage of Vaccinations Registered to Births Registered during the Year (after allowing for deaths of infants under two years).....	46.2	10.1	27.1	31.1	49.9	48.0	57.3	41.1	24.8

## ANNEXURE E.—(Continued).

RE-VACCINATION OF TWELVE-YEAR-OLD EUROPEAN CHILDREN IN NATAL,  
YEAR ENDED 30TH JUNE, 1936.

Particulars.	Durban.	Pietermaritzburg.	Remainder of Province.	Total.
Registration of twelve-year-old European children.....	1,391	482	1,108	2,981
Successfully vaccinated.....	959	265	768	1,992
Insusceptible to vaccination.....	72	93	112	277
Vaccination postponed owing to illness.....	60	17	50	127
Previously had smallpox.....	—	—	—	—
Ratio percentage of vaccinations to twelve-year-old registrations.....	68·9	55·0	69·3	66·8

## ANNEXURE F.

## THE SOUTH AFRICAN MEDICAL COUNCIL.

## RÉSUMÉ OF BUSINESS FOR THE YEAR ENDED 30TH JUNE, 1936.

The ordinary half-yearly meetings of the Council have been held as well as several meetings of the various standing committees. During the year the following registrations were effected:—

170 medical practitioners, 10 dentists, 214 medical students, 4 dental students, 464 nurses, 313 midwives and 6 masseurs. Of the nurses and midwives registered 408 of the former and 290 of the latter had obtained certificates of competency by passing the Council's examinations. The number of persons whose names appeared in the various registers on the 30th June, 1936, was as follows:—

Medical practitioners .....	2,791
Dentists .....	735
Medical students .....	1,036
Dental students .....	27
Nurses .....	5,744
Midwives .....	3,717
Masseurs .....	45
Dental mechanics .....	119

In regard to medical and dental students, no provision has been made for the erasure of names of persons who discontinue their studies prior to completion of courses. Steps are, however, being taken to enable the registrar to make the necessary erasures. The figures given above are, therefore, as described but they do not represent the number of students at present at South African medical and dental schools.

Examinations for nurses and midwives were held half-yearly. The table below shows the number of candidates who presented themselves for the various examinations and the number who passed:—

		Presented.	Passed.
Medical and Surgical Nurses.....	Final.....	317	306
	Preliminary.....	522	383
Male Nurses.....	Final.....	8	7
	Preliminary.....	26	12
Mental Nurses.....	Final.....	97	76
	Preliminary.....	158	111
Nurses for Mental Defectives.....	Final.....	20	19
	Preliminary.....	45	29
Midwives.....		331	290

According to the Council's rules, examinations for medical and surgical nurses are only held twice a year and, as pupil nurses are only admitted to examination if they have completed their training, it has meant that some have had to wait for nearly six months after completion of training before they could qualify as nurses. This has meant an undoubted hardship and the Council has now amended its rules by providing that a pupil nurse may



be admitted to the written examination if she will complete her training within three months of its being held, and that oral and practical examinations, to which only candidates who have completed their training can be admitted, will be held four times instead of twice a year. This will also in a small degree increase the output of nurses. Other measures with this object in view are receiving the consideration of the Council.

The Council has conducted preliminary investigations into a large number of complaints made against persons registered under the Medical, Dental and Pharmacy Act, but in only four cases was it found necessary to hold inquiries as provided by Chapter IV. The penalties imposed were: (a) erasure from the register, but this not to take effect if conduct is exemplary for three years, (b) suspension from practice for six months, (c) caution, (d) reprimand and caution.

During the year reciprocal relations have been entered into with New Zealand for the reciprocal recognition of the medical degrees of the two countries and a Government Notice giving effect to the agreement has been published. The Council has, on the other hand, with the approval of Government, withdrawn recognition of the medical degrees of Italy.

The Council has availed itself of the provisions of Act No. 2 of 1935 and laid down as a condition to the recognition of all medical and dental qualifications that the last three or two years' study, as the case may be, must be taken in the country in which the qualification was granted. The effect of this will be that graduates of non-reciprocating countries will be debarred from obtaining a registrable qualification by only one year's additional study or, in some cases, by merely passing an examination as has been done in the past. Their position will be that they must undergo the same additional period of study as is laid down by the statutes of the universities of the Union.

## ANNEXURE G.

### THE SOUTH AFRICAN PHARMACY BOARD.

#### RÉSUMÉ OF BUSINESS FOR THE YEAR ENDED 30TH JUNE, 1936.

The usual half-yearly meetings of the Board were held in July, 1935, and January, 1936, and, in addition, four special meetings were held besides several meetings of the standing committees.

During the period under review the registration of 62 chemists and druggists, of 17 managing directors of companies carrying on the business of chemists and druggists, and of 55 apprentices was effected. Of the persons registered as chemists and druggists 3 held the certificate of the Pharmaceutical Society of Great Britain, their registration being effected by virtue of the reciprocity agreement entered into with that body; the remainder held the qualifying certificate of the Board. On the 30th June, 1936, the names of 1,329 chemists and druggists, 121 managing directors, and 231 apprentices appeared in the Board's registers.

Examinations were held in December, 1935, and June, 1936. The following tables show the results.

#### PRELIMINARY SCIENTIFIC EXAMINATION.

	Number of candidates examined.	Passed.	Failed.	Referred.		
				Botany.	Chemistry.	Physics.
Whole Examination.....	86	19	41	5	4	17
Botany only.....	16	12	—	4	—	—
Chemistry only.....	8	6	—	—	2	—
Physics only.....	15	10	—	—	—	5
	125	47	41	9	6	22

## QUALIFYING EXAMINATION.

	Number of Candidates Examined.	Passed.	Failed.	Referred.	
				Chemistry.	Dispensing.
Whole Examination .....	82	27	32	7	16
Chemistry only .....	29	12	—	17	—
Dispensing only .....	30	19	—	—	11
	141	58	32	24	27

NOTE.—Candidates for examination in only one subject were previously referred for further study in that subject. By passing in that subject they are accepted as having passed the whole examination.

During the year the Board has completed the work of revising the syllabus for the examination of chemists and druggists. The amended syllabus will be submitted to the Government for approval with a recommendation that it come into effect as and from the first examinations to be held in 1938.

The Board has been obliged to hold enquiries as provided by Chapter IV of the Act into the conduct of two chemists and druggists during the year. In the one case the party complained of had been convicted of an offence under the Gold Law, and the Board found that he had been guilty of disgraceful conduct and imposed a penalty that his name be erased from the register. In the other case the chemist and druggist was charged with making a false statement in connection with an application to register an apprentice: the Board found him guilty of improper conduct and sentenced him to a reprimand.

Amended regulations regarding the keeping, sale or supply of poisons were published under Government Notice No. 1662 of 1935 and have had the effect of removing some anomalies which previously existed in connection with these matters. The Department of Public Health at the same time advised magistrates that copies of all certificates issued under the Act for the sale of poisons and "patent", "proprietary" and "Dutch" medicines containing poisons, must be forwarded to the Board. This has served a good purpose as it has enabled the Board to keep a check on the number of certificates issued in the various magisterial areas and, in some cases, to point out that a certificate had been issued contrary to the provisions of the Act.

A Bill to amend the Medical, Dental and Pharmacy Act, 1928, was introduced into Parliament during the recent session. It made provision, *inter alia*, to enable the Board to deal more effectively with apprentices and corporate bodies carrying on the business of chemists and druggists, and defined the functions of a chemist and druggist, these being matters shown to be necessary by experience in the working of the present Act. It is a matter of regret, therefore, that the Bill failed to become law but it is trusted that it will be re-introduced in the next session.









